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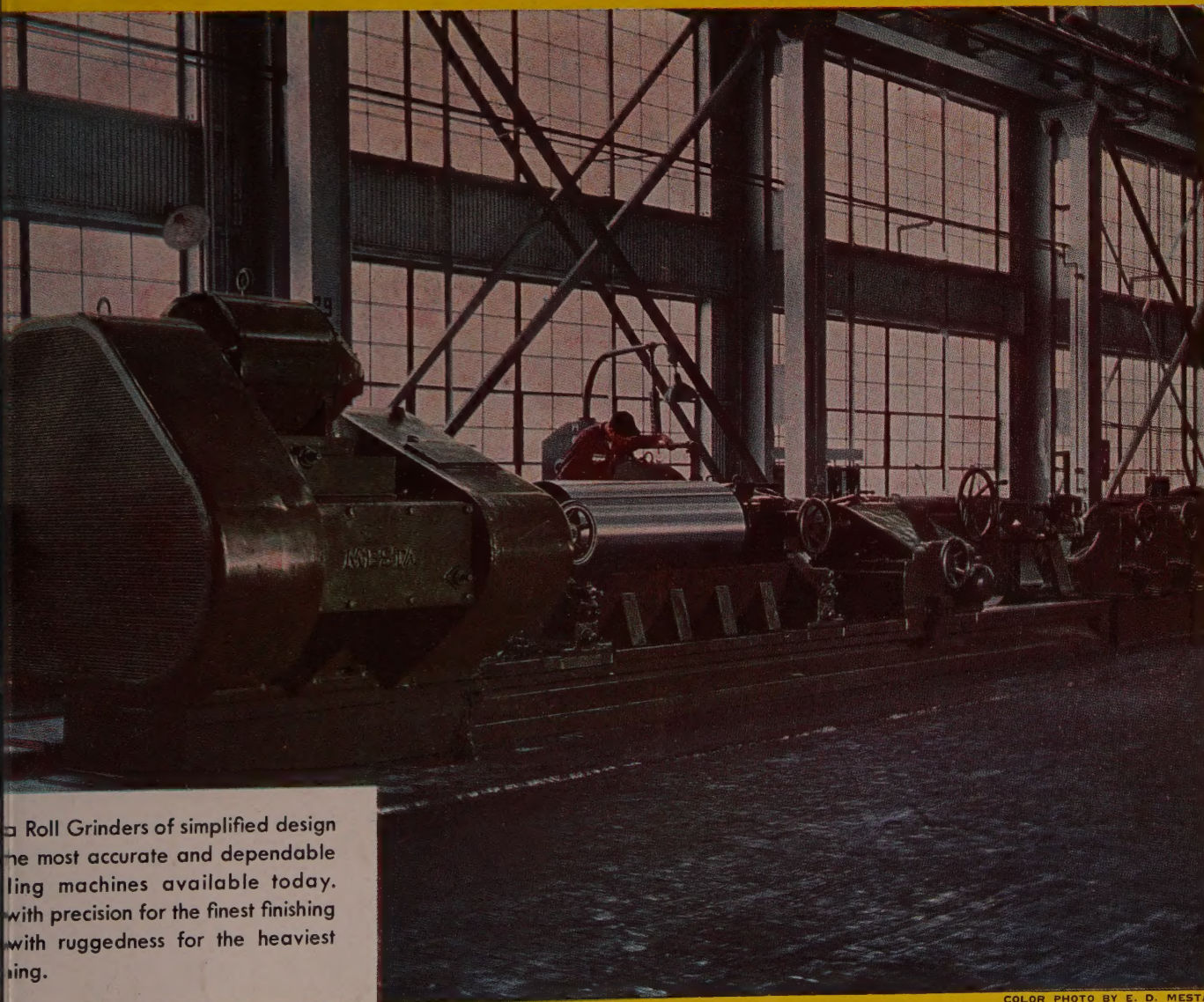
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IRON AGE

NOVEMBER 11, 1948

MESTA

Heavy Duty ROLL GRINDERS



Roll Grinders of simplified design
the most accurate and dependable
ing machines available today.
with precision for the finest finishing
with ruggedness for the heaviest
ing.

COLOR PHOTO BY E. D. MESTA

Mesta 60" Heavy Duty Traveling Wheel Head Type Roll Grinder

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

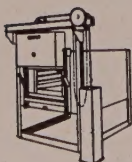
MESTA MACHINE COMPANY • PITTSBURGH, PA.

Hoskins electric furnaces equipped with durable **Chromel*** heating elements

the original
nickel-chromium
heating element alloy



Type FR-206, 207,
208 Box Furnace



Type FR-251
Box Furnace



Type OR-104
Pot Furnace



Type FR
Pot Furnace

If good, dependable equipment is a "must" for your heat treat operations, best you get acquainted with Hoskins electric furnaces. They're sturdily constructed for long-life service . . . well insulated, too, for power economies and more comfortable working conditions. And, of prime importance, every Hoskins furnace is equipped with durable CHROMEL heating elements so designed as to provide maximum heating efficiency and permit quick and easy replacement when required. Catalog-59 describes the line . . . want a copy?

HOSKINS MANUFACTURING COMPANY
4445 LAWTON AVE. • DETROIT 8, MICHIGAN

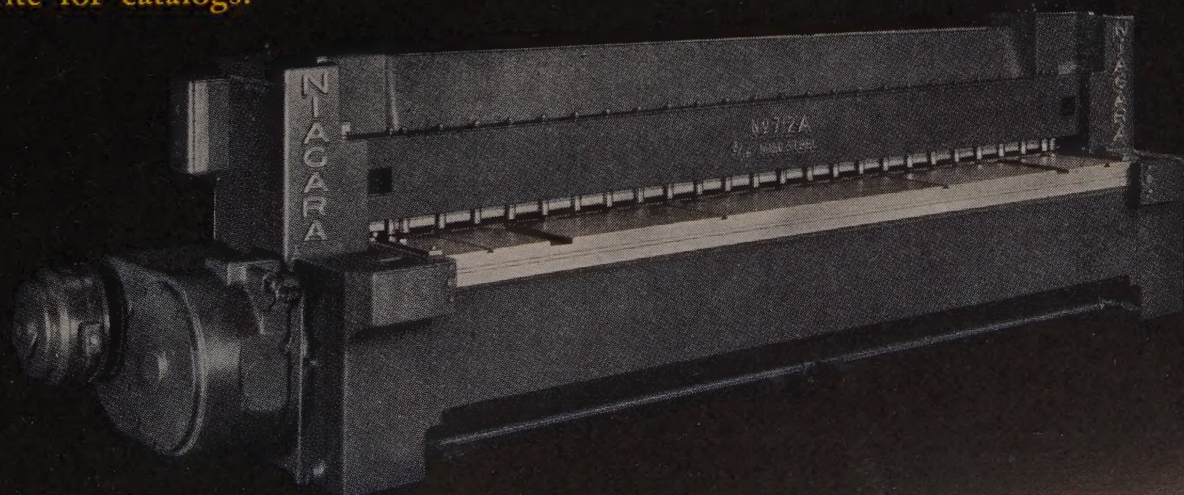
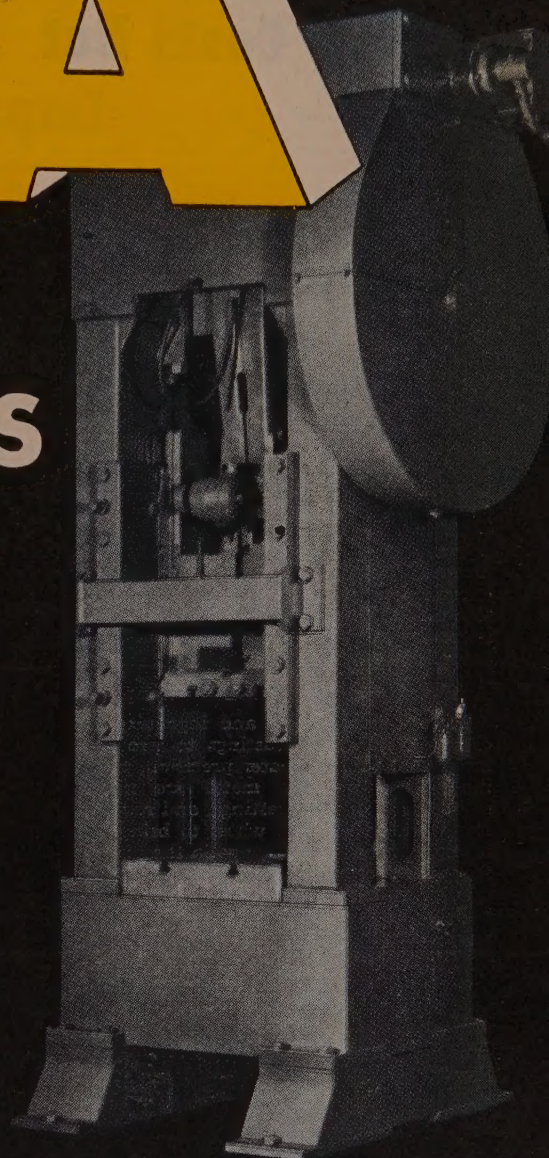
Heating Element Alloys ★ Heat Resistant Alloys ★ Thermocouple Alloys ★ Spark Plug
Electrode Wire ★ Special Alloys of Nickel ★ Electric Heat Treating and Laboratory Furnaces



NIAGARA

POWER PRESSES *and* SHEARS

● Niagara offers America's most complete line of tinner's tools, machines, power presses and shears for production and maintenance. Illustrations on these pages show how they range from items as simple as a rivet set up to heavy presses and power squaring shears. Whether you require hand, foot or power operated equipment, — you get the best when you specify Niagara. Write for catalogs.



DISTRICT OFFICES: • NEW YORK • CLEVELAND • DETROIT

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co.

BRASS
"Bridgeport"
CO.

Headquarters for BRASS, BRONZE and COPPER

Cutting Costs But Improving Quality

The brass handles and decorative parts for high quality fire place accessories—poker, shovel and tongs—were formerly made entirely from brass castings. Now many of these parts are made more economically from brass rod, strip and tubing with resulting higher quality and lower finishing costs.

Reducing Costly Polishing Operations

The polishing operation has always been a high cost factor in manufacturing this type of work because the rough surfaces, characteristic of castings, require considerable and expensive grinding and polishing. Also, added costs result from rejects because of poor castings, whose defects often show up after they receive a certain amount of labor in polishing. The rising labor costs have intensified the necessity for reducing expensive finishing operations.

Wrought Metal Versus Castings

It took imagination and ingenuity to change from rough castings to wrought brass. Aside from greater precision, parts made from wrought metal are much smoother than sand castings, and require less work on the buff wheel to bring up a bright luster. This change in the manufacturing procedure has greatly increased quality while reducing costs. Bridgeport's Ledrite brass rod is ideal for this type work that requires a polished finish. Led-

rite has a smooth surface resulting from special attention to drawing dies, processing and handling. The uniformly high content of lead makes Ledrite brass rod exceptionally free machining and easy on cutting tools.

Where castings are replaced with brass stampings and formed parts which require a high lustrous finish, Bridgeport pays special attention to the temper of the metal, grain size and surface so that finished parts are as smooth as possible. In the case where an assembly consists of both cast and wrought metal parts, it is easily possible to obtain a close match in color from available brass alloys.

Product Improvement

The problem of reducing costs without sacrificing quality is uppermost in the minds of all production men and design engineers at this time. All are faced with high labor and material costs as compared to the prewar period. Some are tackling the problem from the design angle. Many products have not been changed in years. Re-designing, often eliminating a number of unnecessary parts, substantially reduces the size and cost of the item. This was discussed in the July Copper Alloy Bulletin which described the efforts of hardware manufacturers. Precision stampings are rapidly replacing inaccurate castings. In some cases economies are obtained by using extruded brass rod and special shaped tubing which, when cut to length, is actually a semi-finished product which speeds up manufacturing and eliminates spoilage.

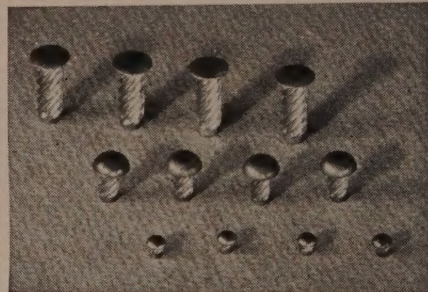
Improving Metal Specifications

In cases where the design is allowed to remain as is, a close evaluation of metal specifications may reveal the need to switch to alloys which possess better machining characteristics to allow increased cutting speeds or the use of more ductile metals in order to eliminate one or more drawing operations. In some items such as valves for example, increased quality can be obtained by

SELF-TAPPING SCREWS MADE OF SILICON BRONZE 609 RESIST CORROSION

Self-Tapping Screws made from Bridgeport Silicon Bronze 609 by the Parker-Kalon Corporation are designed to form their own threads in metal as they are driven with a screw driver or hammer.

This alloy withstands the attack of moisture, smoke, salt air and similar corrosive conditions. It contains 98% copper, 2% silicon and in the hard drawn condition can be supplied with a tensile strength from 80,000 to 100,000 psi. It is remarkably free from failures when subjected to vibration or sustained stresses. Screws made of Silicon Bronze 609 do not rust and are excellent for outdoor construction.

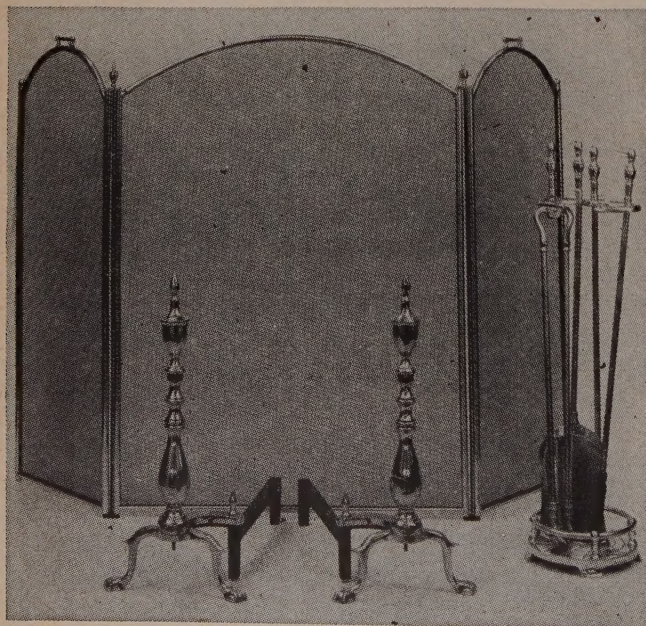


An assortment of self-tapping screws made from Bridgeport's Silicon Bronze 609. Courtesy Parker-Kalon Corp., New York, N. Y.

Silicon Bronze 609 has also proved to be an ideal material from the fabricating standpoint. These screws are made by cold heading and roll threading hard drawn wire. The remarkable malleability of the material, even when hard drawn, makes it comparatively easy on heading tools. Since the metal does not become brittle from working, the screws do not require heat-treatment before or after heading, and thus retain the strength of the hard drawn material.

using stronger and more corrosion resistant wrought metals for valve stems, bonnets and other valve parts. In this way the improved quality may warrant higher prices.

Helping customers with their metal problems is a long established policy of Bridgeport's Laboratory. Years of experience in studying the behavior of metals under various operating conditions and under different types of exposure from the weather, gases, moisture, etc., can be very helpful to customers, in selecting alloys and tempers which will give them the greatest efficiency in fabrication as well as longer service life. Much information on the relative properties of copper-base alloys and valuable tables are published in Bridgeport's Technical Handbook which will be sent to individuals applying for it on company stationery.



Brass has always been associated with high quality and well designed fireplace fixtures. Courtesy American Windshield & Specialty Company, Milford, Conn.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, Research Chemist of the Bridgeport Brass Company.

Galvanic Corrosion in Salt Water

Solutions of chloride salts are recognized as being very corrosive towards the common metals and alloys. Corrosion due to the presence of chlorides is extensively found in (1) sea water, (2) salt refining, (3) in the manufacture of chlorine, chemicals, soaps, etc., (4) cooling brines, (5) vegetable sorting brines, (6) crude oil and petroleum products and in numerous other places. Since salt water is so widely used in industrial operations, galvanic corrosion is commonplace because most equipment is generally constructed from many dissimilar metals and alloys.

Galvanic Series in Sea Water

After extensive testing in sea water, LaQue and Cox¹ prepared a galvanic series for a large number of commonly used metals and alloys. This valuable table is too large for inclusion in this corrosion column. Readers interested should consult the original reference. This galvanic series is very useful along with consideration of the fundamental behavior of galvanic couples² in determining the tendency towards galvanic corrosion for a large number of combinations of metals. No conclusions regarding the rate of corrosion can be obtained from a consideration of potentials alone. Copson³ has discussed at length galvanic corrosion with reference to oil well brines.

The table below was prepared from data taken from a number of sources. The potentials of these metals decline as one progresses down the table.

Galvanic Series in Sea Water

Magnesium (most active)
Zinc
Aluminum
Cadmium
Iron
Lead
Tin
Nickel
Copper
Silver
Gold (least active)

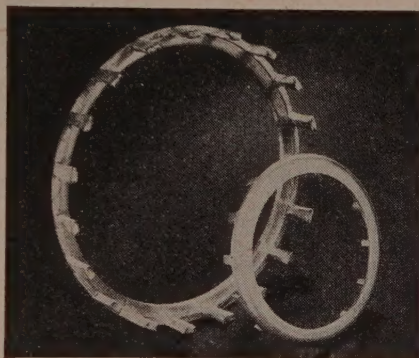
¹F. L. LaQue and G. L. Cox, Proceedings A. S. T. M. 40, 670-687 (1940).

²H. H. Uhlig, "Corrosion Handbook", pp. 481-496, John Wiley & Sons (1948).

³H. R. Copson, American Petroleum Institute, Drilling and Production Practice, 219-228 (1940).

SILICON BRONZE 632 GIVES FINE SERVICE FOR BEARING CAGE

High wear resistance, dependability, strength, toughness and corrosion resistance are essential in the roller bearing cage illustrated. The cage must withstand the loads imposed and maintain the spacing of the rollers in heavy duty service. In order to accomplish this and reduce internal friction and wear of the spherical roller bearings to a minimum, Bridgeport's Silicon Bronze 632 was selected to replace steel for the cage. It has proven highly successful in this application and prevents smearing or binding, which occurs from steel to steel contact.



Cage for spherical roller bearings made of Bridgeport's Silicon Bronze 632. Courtesy SKF Industries, Incorporated.

Bridgeport's Silicon Bronze 632, approximately 97% copper and 3% silicon, has the strength and toughness of mild steel. These properties are combined with fine corrosion resistance. Silicon Bronze 632 also has high fatigue resistance and fair resilience, which contribute to the endurance of the bearing cage.

Other characteristics of Silicon Bronze 632 make it suitable for many varied applications. It can be welded by acetylene gas, electric arc or resistance welding and therefore can be used for fabricating tanks, bridge plates and other structural parts from sheet metal. It is good for outdoor metal and sign work, for washers, cut nails, pole line hardware. It has also found use as a substitute for phosphor bronze for flat spring parts in applications where the flexing movement is not too great.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Wheel Contour Dresser, controlled by interchangeable flat cam plate, is said to dress radii, angles and continuous contours on wheels to 10" in diameter and to 1 1/4" in width. Unit applies on grinding machine table, held by clamps or magnetic chuck.

No. 883

Rotary Indexing Table is reported to carry work or fixture load to 500 pounds, and will rotate to position the work by operating pneumatic valve lever. Adjustable for 4 to 24 positions in a circle, with soft steel 10-inch top.

No. 884

New Plier Type Tool is claimed to be especially useful for crimping sheet metal edges in confined locations, for duct work, crimping copper-sheet roofing material, etc. 2 1/4" or 3 1/2" jaws, 9 1/2" long, grip the work at the bending line.

No. 885

Blind Hole Broach is said to finish close to bottom of previously drilled hole when used on turret lathes, automatics or other machine tool that has power feed to spindle. Cutting flutes on front edge cut like an end mill. Spiral flutes, sharpened on taper 1 1/2" to the foot, finish hole to size.

No. 886

Vertical Milling Fixture is claimed to convert any type of bench lathe to vertical milling machine. Lathe compound is removed and replaced by vise which holds milling attachment. It can also be used for surface grinding.

No. 887

New Diemaker's Hammer is said to facilitate spotting and punching centerlines and intersections. Hammer has flat and ball peen heads with a seven-power lens to assure accurate spotting without worker removing eyes from work.

No. 888

Coil Spring Load Tester is said to be capable of testing to 200 coil springs in an hour with accuracy of one part in 2500. It is reported to handle loads to 5 pounds and spring lengths to 12 inches.

No. 889

New Flame Spectrophotometer is said to make both quantitative and qualitative analyses of large numbers of chemicals, at rate of four samples per minute. Results are read directly on accurately calibrated dial.

No. 890

Micrometer Attachment has been developed to convert outside micrometer into accurate inside micrometer. It can be installed or removed in less than a minute, according to manufacturer.

No. 891

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service with Slitting Facilities in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.
WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—For conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.



BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

now

you can

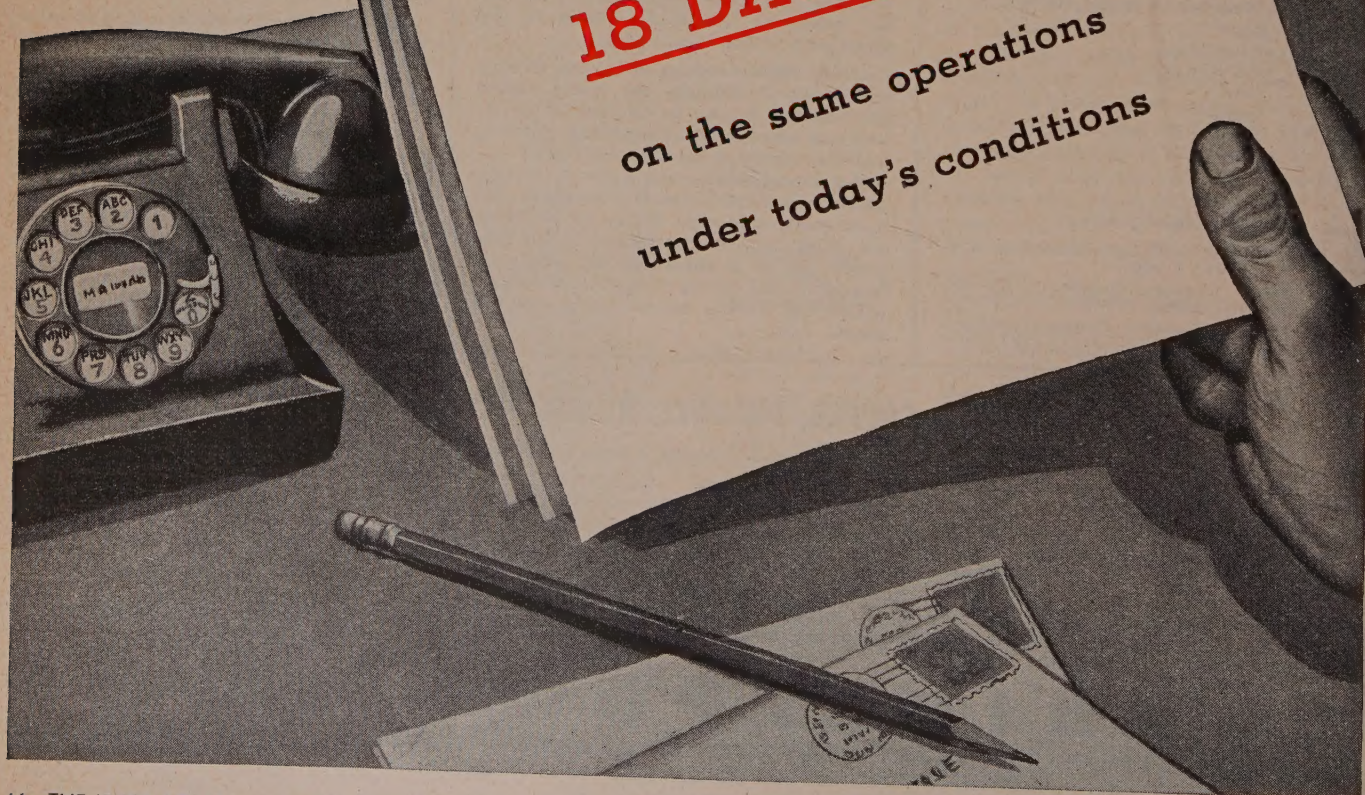
Air Power equipment which,
a few years ago, saved
enough to pay for itself in

30 DAYS

now pays for itself in only

18 DAYS

on the same operations
under today's conditions





It isn't just LUCK

Where one man's chances are as good as another's, you'll find the "lucky" one out ahead in skill and experience . . . better acquainted with his equipment . . . sure of his purpose. And when a successful fellow shares his lore in a neighborly way, there's bound to be greater achievement all around.

The Barium group of steel-working industries serves its many customers better . . . because a spirit of neighborliness among the 16 subsidiary

companies opens the way to many-minded attack on problems of production and fabrication. If your plans involve diverse steel processing, consult Barium. Address any subsidiary listed below in the field of your interest.

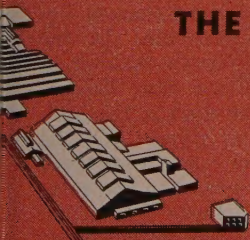
**WE MELT, CAST, FORGE, STAMP, MACHINE
AND FABRICATE STEEL**

ONE OF THE 16 BARIUM GOOD NEIGHBORS

THE DETROIT STEEL CASTING CO. DETROIT, MICHIGAN

Subsidiary of Barium Steel Corporation

produces steel castings ranging in size from a fraction of a pound to ten tons. Analyses range from plain carbon to high alloy steel. . . . This firm supplies automotive, railway, road machine, heavy truck, steam-pump and miscellaneous industries. . . . Detroit has three electric furnaces and capacity of 1500 tons of finished castings per month.



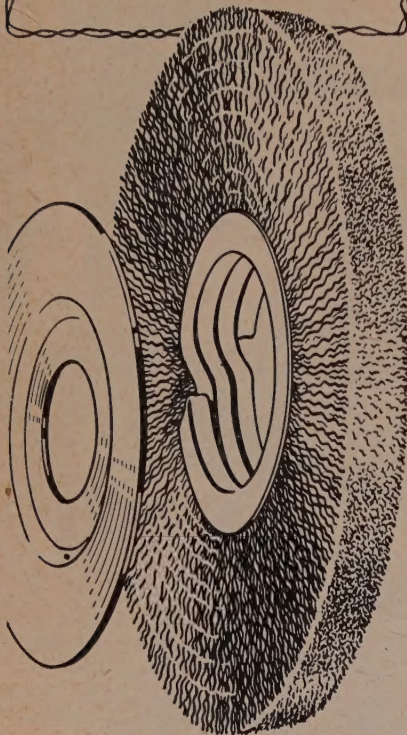
**Barium
STEEL CORPORATION
STEELWRIGHT
TO THE NATION**

BARIUM STEEL CORPORATION

**EXECUTIVE OFFICES
25 BROAD ST., NEW YORK, N. Y.**

AMERICAN STEEL TRACTOR CORP., Canton, Ohio • CLYDE IRON WORKS, INC., Duluth, Minn. • CENTRAL IRON AND STEEL COMPANY, Harrisburg, Pa.
BARIUM STEEL & FORGE, INC., Canton, Ohio • BARIUM EQUIPMENT CORP., BARIUM STEEL EXPORT, INC. • BAYONNE BOLT CORP., Bayonne, N. J.
THE CUYAHOGA SPRING COMPANY, Cleveland, Ohio • THE GEOMETRIC STAMPING COMPANY, Cleveland, Ohio • PERMA-JACK CORP., Cleveland, Ohio
PORCELAIN STEELS CORP., Cleveland, Ohio • THE DETROIT STEEL CASTING COMPANY, Detroit, Mich. • SHEFFIELD IRON & STEEL CO., Sheffield, Ala.
KERMATH MANUFACTURING COMPANY, Detroit, Mich. • KERMATH (CANADA) LTD., Toronto, Ontario, Canada • REPUBLIC INDUSTRIES, INC., N. Y.
GLOBE FORGE, INC., Syracuse, N.Y. • ERIE BOLT & NUT COMPANY, Erie, Pa. • WILEY MANUFACTURING COMPANY, Mountville, Pa., and Port Deposit, Md.

New type WHEEL BRUSH



FULLERDISC

Easy to Install

Costs less to Replace

With Fullerdisc you replace *only* the brush section. You buy side plates just once. Adapters are built into the sideplates, thereby eliminating that expense also. Combination side plate adapters fit all shafts from $\frac{1}{2}$ " to 1".

Available in diameters from 5" to 9" in a choice of materials. For complete specifications send for new folder "Fullerdisc Wheel Brushes".

Write to . . .

THE FULLER BRUSH CO.

INDUSTRIAL DIVISION

3628 MAIN ST., HARTFORD 2, CONN.

Fatigue Cracks

BY C. T. POST

Gallup and Kinsey

• • Since Harry Truman chooses to keep secret the wellspring of his clairvoyant distrust of polls and surveys, it's up to your favorite family journal to pull aside the curtain.

It all goes back to the Kinsey report. Like millions of other Americans Truman read it. He thought about it. He was suspicious of it. Distrust of Kinsey led to distrust of Gallup, Crossley and Roper. When G., C. and R. began to get under the skin of less thoughtful Democrats, Harry remained calm. It was fixed in his stubborn Missouri mind that one survey didn't ring true, so the others deserved no heed. And, as it turned out, he was right.

No one will place much stock in the findings of Gallup, Crossley and Roper for quite a while. But Kinsey is luckier. There's no national election to prove him wrong.

Phoney

• • You probably won't want to bring the matter up for discussion at home, but the chief switchboard operator has given us the earth-shaking results of a little survey of her own. She says that the men in the office talk oftener and longer than the women. Further proof, we say, that you can't trust any survey.

Shake

• • Chief Keokuk, that lovable drum-beater for the Keokuk Electro-Metals Co., bids fair to become as much a matter of national concern as high prices and the Taft-Hartley act. First, we worried



ourselves sick when he appeared with his left and right hands apparently transposed in a contortion of joy. "It's a self-portrait taken in a mirror," we assured ourselves. Then a cynic pointed out that a mirror reverses right and left, but not fore and aft. At this point, United Shoe Machinery's George Pickford walks in to suggest that

the Chief "simply has his back to us, but turned his head to be sure to face the camera." That's a wonderful solution, but the original portrait happened to be full length. Any other ideas?

Now, from John Davenport of the Army Engineers comes the insidious suggestion that Chief Keokuk is a relative of two Arizona Indians committed to a mental institution. The local weekly reported their commitment under the headline, "Right Hand and Left Hand All Mixed Up." The injuns, it seems, were twins carrying the monickers, Right Hand and Left Hand.

Tips

• • Your f.f.j.'s research department, which has occasion to scan publications ranging from the most recent *Transactions of the National Academy* to the June, 1915, issue of Captain Billy's *Whiz Bang*, hands us the following clipping from the bulletin of the Little Giant Co., Peoria:

"A mechanized lunch counter, recently patented prevents patrons from dawdling over their meals and lingering in the seats during rush hours. The counter and seats are mounted on a platform that moves slowly past waitresses who set the successive courses before each diner. Soon after his dessert the patron reaches the end of the line and must vacate his seat—as it drops through the floor."

Fine idea from the waitress' point of view. Almost impossible to leave without tipping.

Competition

• • Latest "Age" publication to come across the desk is the *Cactus Age*, mimeographed news dispenser of the Texas reinforcing steel fabricators. The name, with a bow to your f.f.j. for the second part, grew out of an incident at last year's meeting of the Concrete Reinforcing Steel Institute. In the usual restrained Texas manner, a member of the Lone Star delegation demanded the floor in the middle of a technical paper. To the assembled group, he announced that he had a solution to the reinforcing steel shortage: Substitute cactus. Although the deformations on cactus aren't quite the same as those on concrete bars, the tensile is high, he declared. The spines might even help relieve the nail shortage. Soon after, *Cactus Age* was born.

FLASH BUTT-WELDED STAINLESS STEEL RINGS

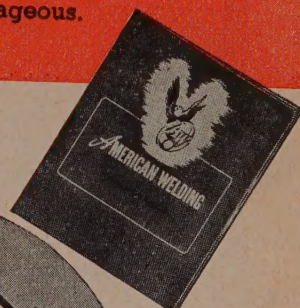
by **AMERICAN WELDING**

Compared with any other manufacturing method, flash butt-welded alloy rings prove to be equally efficient and much less expensive. Records show that there is a substantial

SAVING IN THE PRICE OF RINGS SAVING IN THE COST OF TOOLING

when alloy rings are produced by the flash-butt welding process.

If you use stainless rings, or any other welded product, a few moments spent with our representative may prove to be very advantageous. May we hear from you?



Send
...for 16-page
Illustrated Booklet

REPRESENTATIVE FLASH BUTT-WELD TEST RESULTS
(as welded) FROM AMERICAN WELDING AND
MANUFACTURING COMPANY'S RESEARCH FILES.

<u>ALLOY</u>	<u>TENSILE STRENGTH</u>
Stainless, Type No. 347	91,000 psi.
Stainless, Type No. 410	76,000 psi.
Inconel X	124,000 psi.
N-155	135,000 psi.



THE

AMERICAN WELDING

AND MANUFACTURING COMPANY

120 DIETZ ROAD • WARREN, OHIO

UNIT BINS AND SHELVING

AVAILABLE FOR IMMEDIATE DELIVERY

-WE FURNISH THE STEEL!



The outstanding Fort Steuben line of unit bins and shelving incorporates soundness in basic structural strength, correctness in design and fabrication, and durability of finish, with the special advantage of immediate delivery upon order. The line is fabricated from prime steel materials, which we furnish. Erection is as simple as that found in children's construction sets. For detailed information phone, write, or use the convenient coupon below.

Pictured above is a Fort Steuben 6-shelf Commercial Unit. Uprights are of 13 gauge angle stock in all standard heights, shelves are pressed from 18 gauge sheets and are available in all standard sizes. According to the Fort Steuben unit plan, uprights are drilled to permit placing of shelves at 1½" intervals over their entire height, and backs and sides may be used at will. At right, is shown a single or starting unit for closed type shelving.



Fort Steuben Auto Parts Bins (see left) are particularly designed for parts storage, not only in the automotive industry, but in many other industries as well. The need for indexing is met through the use of full shelf-length label holders, standard on all Parts Bin Shelving. Lightning-fast adaptation of these bins to frequent changes, required in sectionizing storage requirements is effectively accomplished through the use of patented snap-in dividers, instantly adjustable on 1" centers over the entire shelf width. Shelf heights are adjustable on 1½" centers, and several combinations of sizes are available. Bins to meet all car manufacturers planographs or bin system requirements are available. Dealers and Manufacturer's Agents are invited to write.

Fort Steuben Metal Products Co.

Steubenville, Ohio · Phone: Steubenville 26204

Fort Steuben Metal Products Co.
Steubenville, Ohio

Gentlemen: Please send me your complete catalog IA.

Name _____ Title _____
Company _____ Street _____
City _____ Zone _____ State _____

Dear Editor:

LAWRENCE THOMAS

Sir:

It was with interest that I read the article in the Oct. 14 issue entitled "The Alloy Steel Industry." A great amount of data have been correlated and presented in a worthwhile manner. However, if my memory does not fail me, it was Lawrence Thomas, now deceased, when he was chief metallurgist of Timken Detroit Axle in the early 1920's, who promoted the use of chromium-nickel-vanadium carburizing steel for differential gears and pinions. This steel was adopted by the Chrysler Corp. in Sept. 1924 for differential gears and pinions in passenger cars and was standard until replaced by Amola in the middle 1930's.

B. B. BECKWITH
Metallurgical Engineer

Vanadium Corp. of America
Detroit

COPPER BRAZED JOINTS

Sir:

Kindly supply us with two copies of the article entitled "Properties of Copper Brazed Joints" which appeared in the Sept. 30 issue.

W. G. MERTENS
Chief Metallurgist

Detroit Transmission Div., General
Motors Corp.
Detroit

INVESTMENT CASTING

Sir:

We would appreciate your sending us two copies of the article "A Critical Survey of Investment Casting" from the May 6 and 13 issues.

G. N. DONOVAN
Technical Library

Western Electric Co., Inc.,
Kearny Works
Kearney, N. J.

FASTENERS AND DESIGN

Sir:

I am writing to ask for tear sheets of the article "Effective Use of Fasteners in Product Design" from the Sept. 23 issue. I'd like to have this article for the manager of our research division.

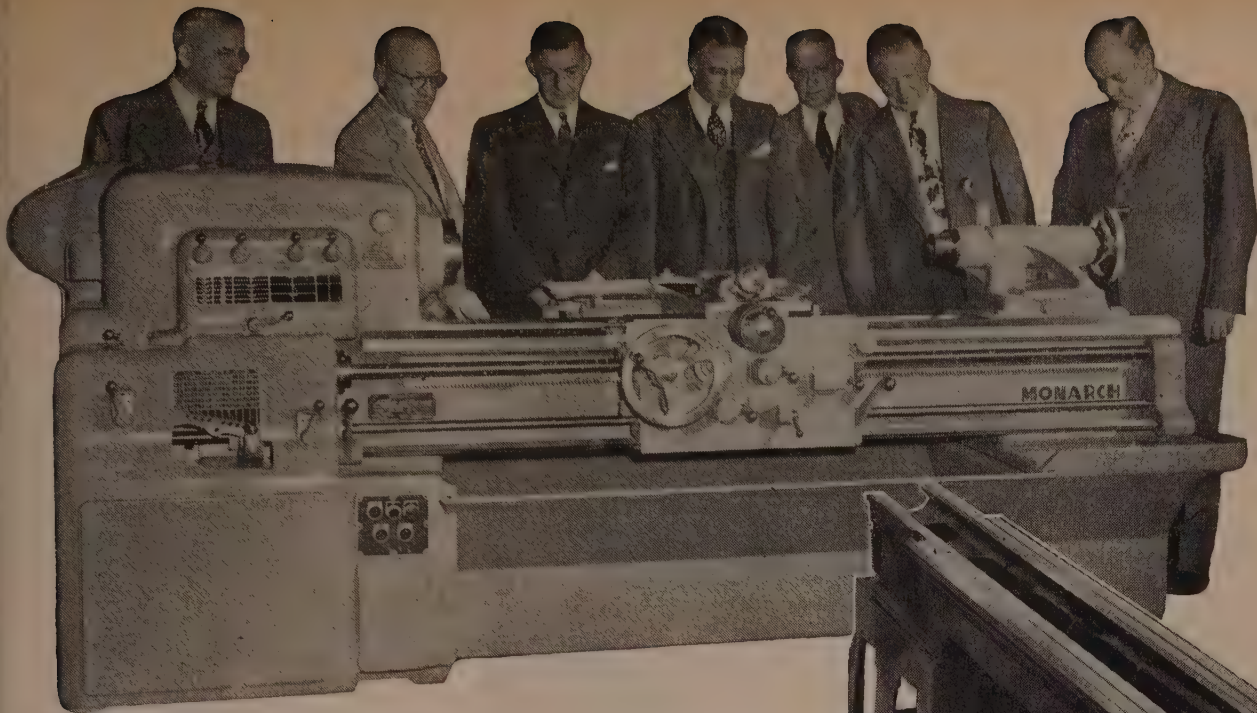
DON POOR
Advertising and Sales
Promotion Mgr.

Ceco Steel Products Corp.
Chicago

MILL LOCATIONS

Sir:

Earlier this year the Dept. of Commerce published a map showing the geographical distribution of steel producing plants in the United States as of Jan. 1, 1948. Could you tell me if this map has been reproduced in any of your issues? The Department states



25,000th Monarch Lathe with exclusive Flame-Hardened Ways; a 14" x 54" Series 60 Engine Lathe purchased by B. F. Goodrich Co.—one of many repeat orders from this customer. Customer's Engineering Division was represented by its Master Mechanic in charge of Machine Tool Operations, as the lathe was made ready for shipment.

Unretouched photograph of bed of Monarch 12" Engine Lathe after eight years' severe service. Inspector's report shows no measurable wear of ways.



Salute!

from a Veteran to Its 25,000th Brother

"SO you're the 25,000th Monarch Lathe with the famous Flame-Hardened Ways! You look so sleek and sure—and accurate—I don't blame your purchaser for being proud of you. Monarch's just as proud of me.

"Let me tell you why. I'm eight years older than you—and I've seen a lot more service than any ordinary lathe ever lives to see. I went to work back in September, '40. Right after that the war began, and I started working 24 hours a day, seven days a week. Hard work, too—I was turning out short pieces—plenty of short motions of my carriage, the kind that wear you down. And even though I told my operator it was bad, he often cleaned me off with an air-hose! But all that didn't stop me—I kept right on turning out war parts 'round the clock—each one with as fine a finish, as close a tolerance as the first I ever turned.

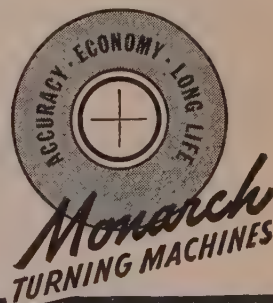
"Well, the war finally ended—but I kept right on working—though they did let up on my hours. I work a regular eight-hour day now, right along with the other

master craftsmen. Recently my owners decided to hedge on rising production costs by sending me back to Monarch to be fitted out with the latest in time-saving, money-saving attachments. That's how I happen to be here for your christening party.

"But let me tell you what they've just found out about me. When they came to tear me down for inspection, they couldn't even find any measurable wear on my ways! Now do you blame 'em for being proud of you—and me?"

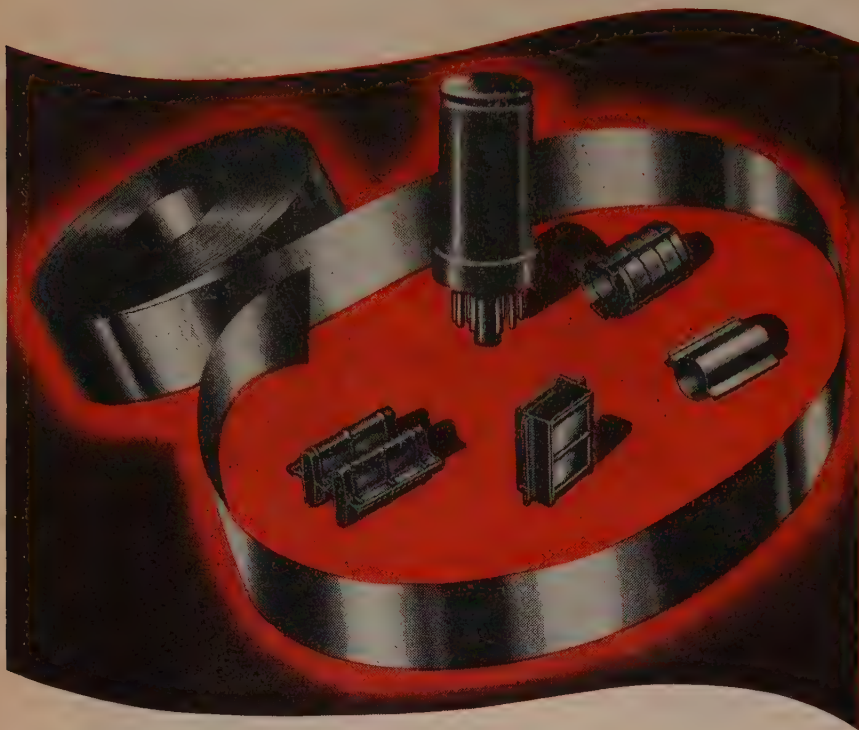
★ ★ ★ ★

The famous Monarch Flame-Hardening Process is an exclusive construction feature of every Monarch Lathe—one of many "pluses" to give you peak production at a profit. Write for complete details.



MONARCH MACHINE TOOL CO. • • • Sidney, Ohio

specialized ThomaStrip . . .



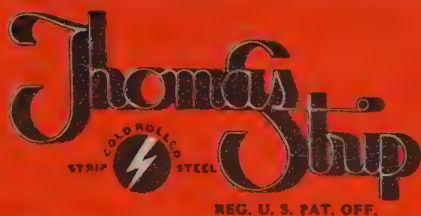
reduces raw material costs in electronic applications

For many years Specialized ThomaStrip has been the means of reducing raw material costs in the Electronics Industry. More costly metals have been replaced by Cold Rolled Strip Steel, coated and uncoated, which specifications were developed through the co-operation of the Industry and The Thomas Steel Company. Most satisfactory results have been obtained as exemplified by their continued use.

Perhaps ThomaStrip may lower your costs or give you a better finished product—or do both. Thomas' engineers welcome the opportunity to try.

THE THOMAS STEEL CO. WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS



ELECTRO-COATED ZINC,
COPPER, NICKEL, AND BRASS...
HOT DIPPED TIN AND LEAD ALLOY...
LACQUER COATED IN COLORS...
UNCOATED PRECISION STRIP...
CARBON AND ALLOY SPECIALTIES

that their supply of maps has been exhausted.

FORREST H. GRAVES
Vice President

Cambridge Associates
Boston

● No, we didn't reprint the map. However, we have sent you a chart, "Basing Points of Major Steel Products," from our Jan. 1, 1948 issue which shows where the various products are made and may give you the information you need.—Ed.

TOOL STEEL DIRECTORIES

Sir:

Please forward 15 copies, along with the bill, of the latest issue of the "Directory of Tool Steels."

JOHN E. NEWLIN, JR.
Steel Sales Dept.

Henry Disston & Sons, Inc.
Philadelphia

● In quantities of 6 or more, the directories are \$1.00 apiece.—Ed.

CONTINUOUS CASTING

Sir:

Will you please send me a copy of your reprint entitled "Continuous Casting of Semi-Finished Steel" which appeared in the Aug. 19 issue.

D. A. BUSCH

American Smelting & Refining Co.,
Perth Amboy Plant
Barber, N. J.

CORRECTION

Sir:

In the Oct. 7 issue, the news item headed "Buys Electro-Alloy Plant" is in error. The plant referred to was built, designed and operated by the Ohio Ferro-Alloys Corp. for the D.P.C. under the name of Wenatchee Alloys Corp., and was not operated at any time by the Electro-Metallurgical Corp.

J. C. VIGNOS
Vice President

Ohio Ferro-Alloys Corp.
Canton, Ohio

PIPE AND TUBE PLANTS

Sir:

We would appreciate your forwarding to this office, if possible, a list of pipe, tube and plate manufacturers throughout the United States, showing their mill locations.

A. W. DAGISTINO

Lummus Co.
New York

● The lists are in the mail.—Ed.

STANDARDS DEPARTMENT

Sir:

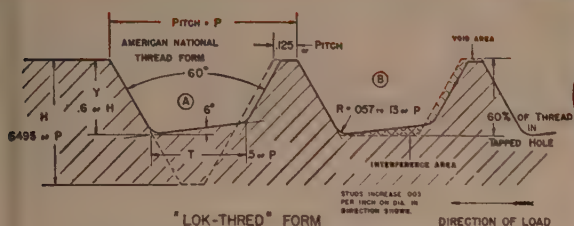
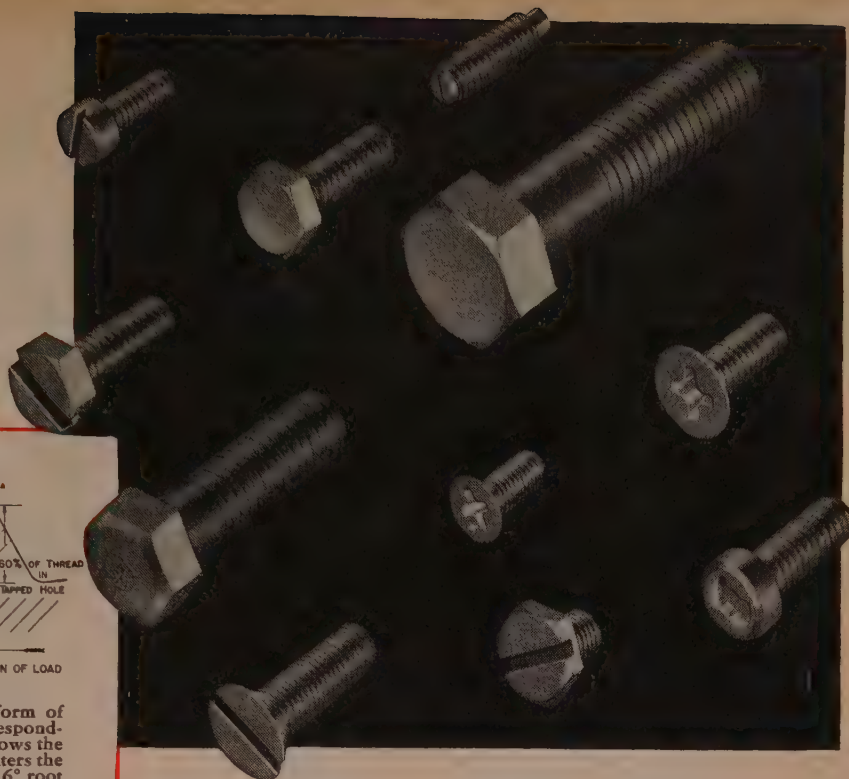
We believe you published an article some months ago describing a system for standardization of materials and specifications. Will you advise the date of this issue and assist us in procuring a copy.

F. M. ROSS
Purchasing Agent

Consolidated Car-Heating Co., Inc.
Albany, N. Y.

● You probably mean the article "The

the only thread that OF ITSELF holds tight



The heavy black line at position A shows the form of "Lok-Thred", while the dotted line shows the corresponding American National Thread form. Position B shows the action which occurs when the male "Lok-Thred" enters the 60% American National Thread tapped hole. The 6° root angle, through the interference created, causes a reforming of the socket thread, which fills the void area and causes a locking action, plus a positive seal.

IN "LOK-THRED", NATIONAL SCREW

OFFERS AN IMPORTANT NEW TYPE OF BOLTS AND SCREWS

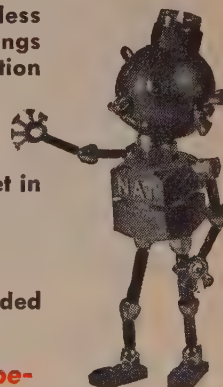
"Lok-Thred" fasteners actually become tighter in service, even under vibration. They are available now in bolts and screws as well as studs, and with special or standard heads.

They not only lock more securely than American National Threads (see diagram), but also seal positively, even against liquids under pressure. Bosses and blind tapping can be eliminated.



Note These Important "Lok-Thred" Advantages

1. Lock securely and become tighter in service.
2. Have much higher fatigue limits than fasteners with conventional threads.
3. Stronger in both tension and torsion than ordinary American National Threads.
4. Carry entire normal working load on 6° angle at root of thread under high compressive prestress.
5. Modified American National Threads permit use of standard tools.
6. Re-usable and on any re-application less than one-half additional turn brings torque back to its original installation value.
7. Do not require selective fits.
8. Do not gall when being driven nor fret in service.
9. Act as dowels and taper pins.
10. Seal positively and eliminate added bosses and blind tapping.



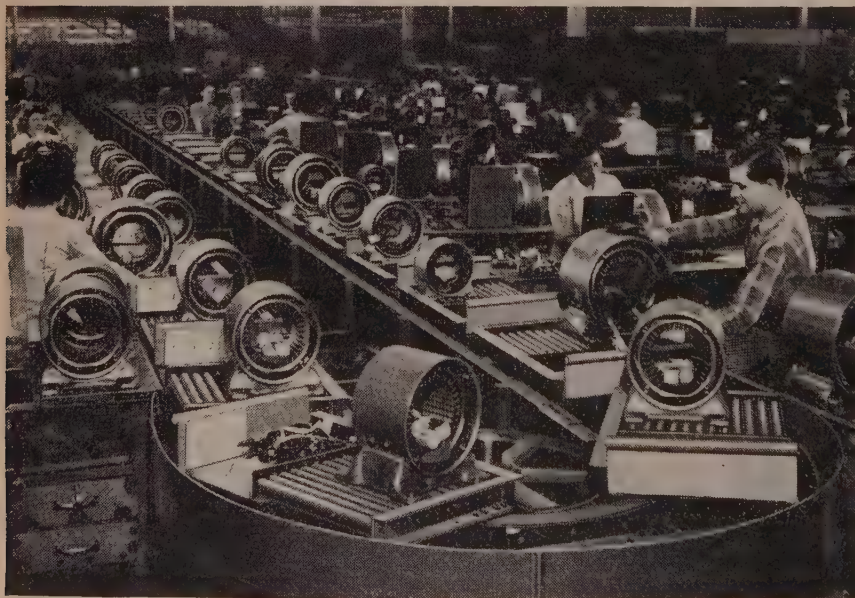
Write for "Lok-Thred" booklet, or send specific information on your fastening problem.

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

"COOLIE" CONVEYING IS COSTLY



Yes, "coolie" conveying is costly because it takes so much manpower to reach modern production capacity levels. If you're using manpower in material handling — you're using a "coolie" system. Conveyors keep manpower on the production line! Investigate Standard Conveyors to handle pieces, parts, units, assemblies, cases, cartons, boxes, barrels, bales, bundles, packages — everything from mail to malleable iron castings! There's one to meet your needs in shop or warehouse. Standard Conveyor Co., General Offices: North St. Paul 9, Minn. Sales and Service in Principal Cities.



FREE HELPFUL LITERATURE
Send for Standard's Catalog. See how conveyors are used in every field of industry. Ask for Bulletin No. 1A-118

Standard
GRAVITY & POWER
CONVEYORS

Standard Department — Its Organization and Function," from the May 27 issue. Tear sheets are on their way.—Ed.

HIGH TEMPERATURE SHEETS

Sir:

I am very much interested in receiving tear sheets of the article "Sheet Metals for High Temperature Service" from the Sept. 23 issue. I would appreciate receiving 6 sets.

B. G. CLARKE
Assistant Manager

Pacific Metals Co., Ltd.
Los Angeles

COLOR METALLOGRAPHY

Sir:

I would like to obtain copies of the articles "Color Metallography" and "As-Cast Structures in Cast Steels" from the Oct. 14 issue.

R. V. JONES
Metallographer

Copperweld Steel Co.
Warren, Ohio

TUNGSTEN CARBIDE ROLLS

Sir:

We should greatly appreciate receiving tear sheets of the article "Tungsten Carbide Rolls for Wire Flattening" from your Oct. 9, 1947 issue.

H. C. FRIEDEMANN
Librarian

American Electro Metal Corp.
Yonkers, N. Y.

PLASTIC PATTERNS

Sir:

Will you please furnish three copies of the article "Precision Casting with Plastic Patterns—The A.R.D. Process" which was published in the Oct. 7 issue.

J. F. COULTIER
Research Laboratories

Bendix Aviation Corp.
Detroit

TIME STUDIES

Sir:

Please send me tear sheets of the article "Right and Wrong of Time Study Computations" from the Aug. 17, 1944 issue.

J. M. FOX, JR.
Manager, Precision Forging Div.

Utica Drop Forge & Tool Corp.
Utica, N. Y.

DISCOVERERS OF STAINLESS

Sir:

Please send me tear sheets on "Who Discovered Stainless Steel," Oct. 14 issue.

A. D. EPLATT
Chief Engineer

Manning, Maxwell & Moore, Inc.,
Research Div.
Bridgeport, Conn.

TOOL STEEL CHARTS

Sir:

I would greatly appreciate it if you would furnish me with two tear sheets

ere is **WHY** the

CONCAVE SIDE

(U. S. PATENT NO. 1813698)

SAVES You Many DOLLARS In V-BELT Costs!

Every time a V-Belt bends around its pulley, the *top* of the belt is under *tension* and grows *narrower*. The *body* of the belt is *compressed*—causing the *sides* to *bulge out*!



FIG. 1

This forced bulging of a *straight-sided* V-Belt against the sheave groove walls naturally produces excessive wear along the *middle* of the belt's sides—as indicated by the arrows. Also, because the full side of the belt does not *uniformly* grip the pulley, there is a definite loss in drive efficiency.

Now see the difference when you bend the V-Belt that is built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

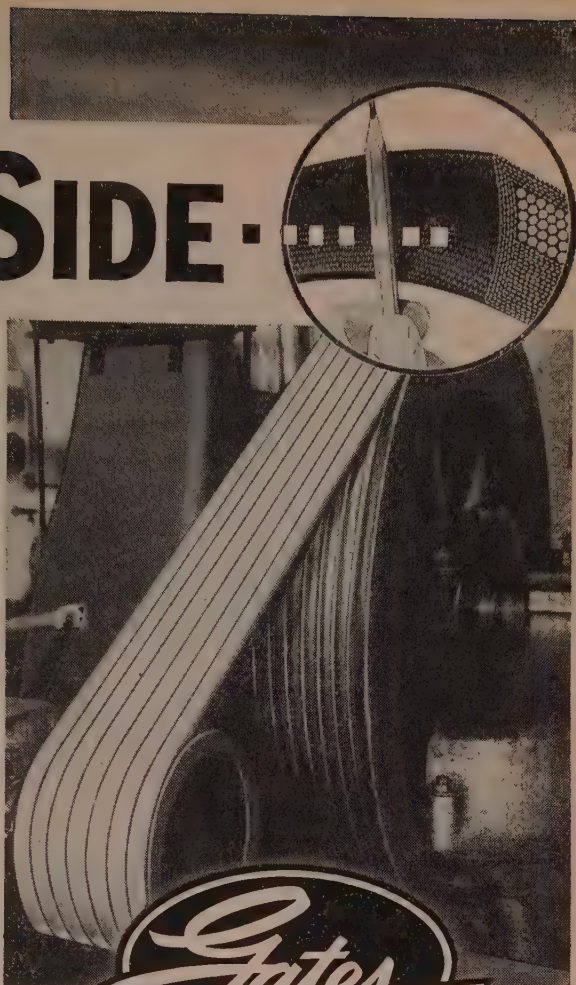


FIG. 2

As the Gates Vulco Rope bends, its Concave Side becomes straight (Figure 2). It exactly fits the sheave groove—and this gives you two very definite savings:—

(1) No out-bulge of the sides means uniform side-wall wear—*longer life*!

(2) *Full side-width* grip on the pulley carries heavier loads and sudden load increases without slippage—saving your belts and saving power too!



REG. U. S. PAT. OFF.

The Mark of SPECIALIZED Research

The Concave Side is MORE IMPORTANT NOW Than Ever Before!

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

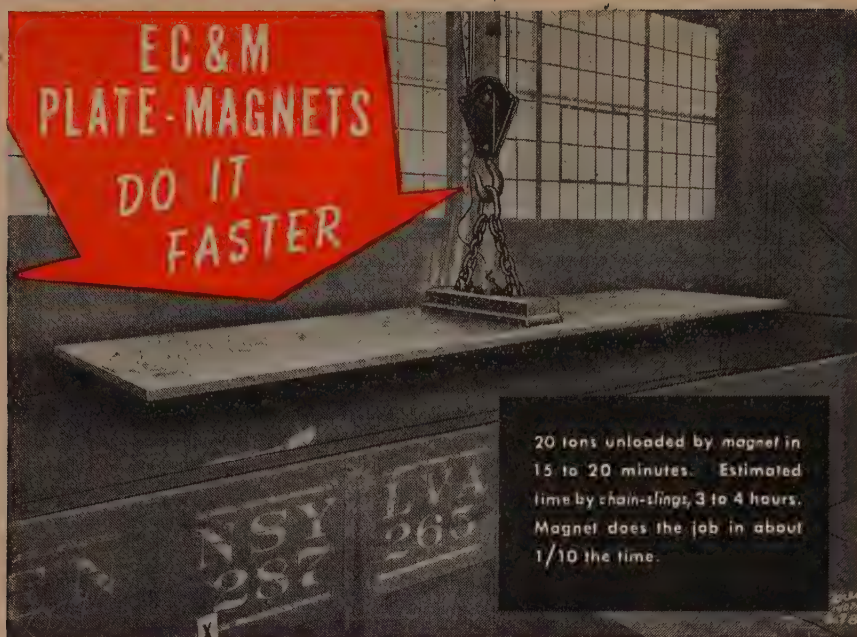
Now that Gates SPECIALIZED Research has made available to you *SUPER* Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.

"The World's Largest Makers of V-Belts"

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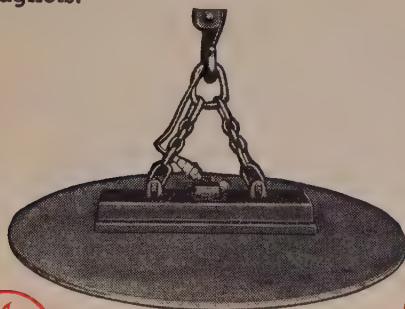


SAVE UP TO 90% IN UNLOADING TIME

Here's a plant that uses several EC&M Plate-Magnets in the loading, unloading, stacking and processing of their plates, sheets, bars, pipe, etc. On long pieces, they use two magnets on a spreader-bar.

These EC&M Magnets not only reduce operating costs but they speed up handling. Railroad cars or trucks are loaded or unloaded without delay and handling throughout the plant is fast. There's no prying to affix chains and no danger of pinching hands when securing chains.

Send us the complete facts of your handling needs, so that we may write fully when sending Bulletin 903 describing EC&M Plate-Magnets.



Burned Plates, too, pull out easily when lifted by Magnet.

TELL ALL FOR PROMPT RECOMMENDATION

- Give an idea of your plant layout and equipment, and material handled, such as
- 1- Style and capacity of crane.
 - 2- Voltage available (direct current is required for magnets).
 - 3- Overall dimensions and weight of material handled.



THE ELECTRIC CONTROLLER & MFG. CO.

109 1/2 EAST 79TH STREET

CLEVELAND 4, OHIO

of the charts "Comparative Tool Steel Brands," from the issue dated July 29, for future reference of our Inspection Department and Metallurgists.

PAUL E. F. BUSSE
Chief Inspector

U. S. Naval Ordnance Plant
Louisville

TRADE NAMES

Sir:

I am enclosing a check for \$3.00. Please send me a copy of your book entitled "Directory of 10,000 Trade Names."

STANLEY M. GOODMAN
Syracuse

BONUS PLAN

Sir:

I would appreciate having copies of two of your articles. "Bonuses Based on Production Values" from the July 1 issue and "Right and Wrong of Time Study Computations" from the Aug. 17, 1944 issue.

R. J. DEAVER
Personnel Director

Line Material Co.
Zanesville, Ohio

GRAY MARKET

Sir:

Please send us a copy of the gray market report from the Oct. 14 issue which gives the results of the Macy Committee investigation of questionable trade practices.

W. M. DILLON
Asst. to the President

Northwestern Steel & Wire Co.
Sterling, Ill.

DIAMOND POWDER

Sir:

I am assembling information on industrial diamond tools. Will you please forward a copy of the article "Diamond Powder Increases Polishing Efficiency" from your March 13, 1947 issue and also copies of any other articles relating to diamond tools or powder.

HARRY L. STRAUSS, JR.
National Diamond Hone & Wheel Co.
New York

MAGNETIC INSPECTION

Sir:

Would appreciate tear sheets on the article "Standards for Magnetic Particle Inspection" appearing in the Aug. 12 issue.

ROLF O. BREUER
Materials Engineer
Pasadena, Calif.

AS-CAST STRUCTURES

Sir:

I would appreciate your sending tear sheets of "As-Cast Structures in Cast Steels" published in your Oct. 14 issue.

JAMES H. SCOTT
Research Engineer
Bethlehem Steel Co., Lebanon Plant
Lebanon, Pa.

THOMAS L. KANE

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November 11, 1948

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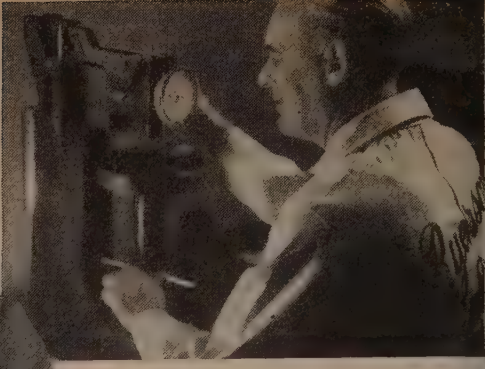
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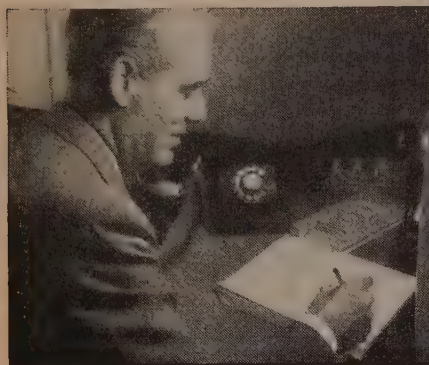
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Howard Allen, Sales Representative



Howard Allen, Lab. Man



Howard Allen on Order Desk



Howard Allen, Machine Operator

Outside Man with an Inside Story

Do you know the inside story behind your Ryerson sales representative? It's a story of years spent within a Ryerson plant. A story of the steel inspection department, the operating department, the service department and others—inside jobs through which a Ryerson salesman builds up the experience he applies—outside—to your steel problems.

That's why you can be sure you're dealing with an experienced steel man when a Ryerson representative calls. He offers a complete steel service—carbon, alloy and stainless, sheared, sawed or slit, burned or bent, punched

or threaded. And he can put to best use all the smoothly coordinated functions that make up this steel service, because he knows about them first hand.

Of course, he can't work miracles. Right now there simply isn't enough steel to meet current demand. But you can depend on your Ryerson salesman to cooperate closely and intelligently with you. From long experience he can often suggest practical alternates when the steel you need is not available. So, to make the most of available steel, talk it over with your Ryerson representative or phone our nearest plant.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

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November 11, 1948

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In Character

ON October 28th weary diplomats in the capitals of the Western world were startled by an interview which Stalin gave to Pravda. They were startled because in content, spirit and language it sounded precisely like the bitter vials of wrath more or less regularly spewed out by Molotov, Vishinsky, Manuilsky, and the other voices of the Kremlin. In the thinking of some statesmen and many editors, commentators and businessmen, a gentle fiction had been built up, namely, that Stalin was a benign, conciliatory elder statesman with the tolerance and personal amenities so singularly lacking in his subordinates.

In fact, it had even been assumed in some quarters that Stalin was the prisoner of a truculent Politburo whose aspirations and international manners he could no longer restrain. If our boys could only talk directly to Joe, those problems that had foundered on the intransigence of Russian negotiators could easily be solved in a direct man-to-man discussion with Joe. It was certainly some such wishful thinking that produced the ill-advised plan to send Justice Vinson to Moscow.

Joe now comes out of his corner snarling and doing what comes naturally. The Western powers are "Churchill's pupils in aggression," repudiating their own emissaries and conspiring to place Russia in a position where she may be accused of supporting a new war. The hard-working neutrals, led by Argentina's Bramuglia, who searched painstakingly and patiently for a formula of compromise are paid off with the barbed charge that they are "lending their support to a policy of aggression."

In passing it need only be said that this diplomatic billingsgate is directed at nations which disarmed themselves to the point of impotence after the war; who refused to accept the traditional spoils of war in the form of added territory; who are making substantial sacrifices to ameliorate the lot of defeated foes; who have granted independence to the Philippines, Egypt, India, and Burma. The outburst demonstrates one of the cardinal axioms of, totalitarian propaganda: Always accuse your adversary of your own most conspicuous vices and accuse them first.

Joe's catechism on Berlin serves this useful purpose. It reveals him in his true light to those visionaries who persist in their own self-deception; who hold, as did our chief Russian adviser at the Potsdam Conference, that Joe is "a man on whose lap a child would like to sit, while a dog would sidle up to him."

Actually Russian policy, with its calculated dissimulation, its frank use of force and fraud, its cultivation of deliberate treason in the bosom of friendly nations, its promotion of chaos and class warfare, is an authentic reflection of the Kremlin despot. In his last days before he died, Lenin concluded that Stalin was a dangerous man for the Communist Party to harbor. "The Testament of Lenin" attacked him as "rude," "disloyal," "capricious," "nationalistic," and "spiteful," and asked that he be removed as general secretary of the party. Joe took care of the "Testament" and for many years denied its existence. It is a pity Lenin did not make his discovery sooner. The record shows that on the subject of Stalin, at least, he knew what he was talking about.

Joseph Stagg Lawrence

**"I Like the
UNIFORMITY
of Inland Steel"**



**THE MEN WHO WORK
WITH INLAND STEEL
KNOW ITS QUALITY!**



Enameling plant inspectors know how steel sheets that vary in chemical composition and physical properties can cause serious warpage problems. These men prefer steel that's *uniform*. That's why they like steel *made by Inland*. Uniform source of raw materials... uniform steelmaking procedures using the same modern equipment... uniform workmanship—made possible by Inland's completely integrated, closely knit plant—explain why the uniformity of the Inland steel received today will be the same as that received last month... or last year.

INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill.

Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.



BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • FLOOR PLATE • PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES

➤ The steel industry had shown a dislike for the voluntary allocation program--before the election. It probably still dislikes it. But not badly enough to exchange it for a government imposed set of allocations. For that reason there is now more possibility that the voluntary program may be extended. But if it is, the extensions may be a deal between the government agencies and each steel company--not a deal between the industry and government. That is the way it looks unless the government moves first on a straitjacket plan.

➤ Scrap from the French Navy in the form of cut up keels is being offered in this country at \$5 above the world price. A Belgian firm will handle the demolition which is expected to produce 100,000 metric tons--75,000 tons of which the French would like to sell here.

➤ Alloy bar deliveries have become so tight that a large California user made a visit to tool steel makers in the Midwest offering to pay tool steel prices for his bar requirements. So far the tool steel makers have not offered to help--they are booked solid into the first quarter.

➤ A carload of steel was recently unloaded at a midwestern warehouse in a little more than a third of the usual time by using a weighing device attached to a crane hook. The device has already been proved on batch weighing of tanks and is now being tested for use on steel mill weighing jobs.

➤ Auto dealers, particularly those who have expanded their plants since auto production was resumed, are casting an anxious eye on their inventories which have climbed nearly 200 pct. During the same period, sales of parts and accessories have increased only 100 pct.

➤ Industrial observers familiar with the problem of strategic materials report that Russia is using Berlin as a smoke screen for operations in Manchuria, Korea and elsewhere in the CBI theater to obtain tungsten, molybdenum and tin as well as other materials.

Much of Japan's industrial plunder was taken to Manchuria, including machine tools and other capital equipment. In the meantime, Russia is also carting away every machine tool plant in the Russian zone of Germany.

➤ Two vital questions are being raised in the automobile industry in the wave of election results. Who is going to hold labor in check now? To what extent does the tide reflect growing public disapproval of booming car prices?

➤ Great Britain is now operating 343 balanced blast cupolas, according to a recent report. These cupolas have a total hourly melting capacity of 2640 tons.

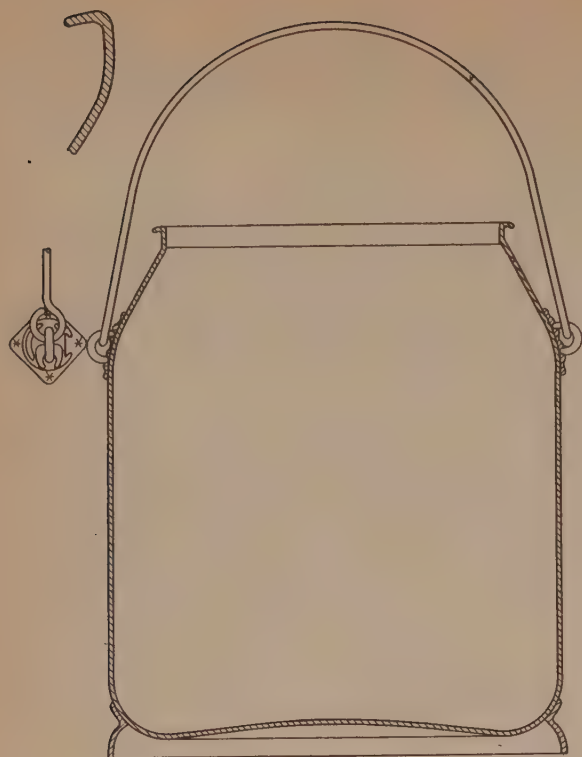
➤ To avoid the expense of complete ingot stripper crane installation, a midwestern steel mill has bought a recently developed 250-ton portable hydraulic ingot stripper that can be picked up by an ordinary crane. Its cost is about \$25,000.

➤ The climb in station wagon business has come as an unexpected surprise to many auto executives. Estimated 1948 volume will be close to 100,000 units; the total in 1940 was only 25,000 units. Crosley is expected to account for about 30 pct of the total.

➤ Use of radioactive isotopes as a source of beta emissions for non-contact strip steel gaging is being investigated by at least two companies. Results to date have been inconclusive.

Combining radioisotopes and an electrical circuit to permit continuous measuring of the height of molten iron in a cupola is quite practical, according to one Detroit authority.

➤ The findings of the Humphrey Committee are expected to weigh heavily when Paul Hoffman sits down to review German plant dismantling with the British and French. Undoubtedly he will meet strong opposition, especially from the French. Still he holds a pretty good hand. Result will probably be a compromise retaining in Germany some plants currently slated for dismantling.



Shown here is the assembly of the milker pail without the cover after the bail ears and the bail are applied. All sharp edges around the bail ears and around the bottom ring are soldered to provide a smooth fillet.

Drawing Stainless Milker Pails

Improved drawing properties and surface finish of stainless steel, improved die construction, better draw compounds and other manufacturing refinements have reduced from five to four the number of draws and from two to one the number of bulging operations required in producing 50 and 70-lb milker pails. Fewer anneals are also required. The manufacture of these milker pails, an outstanding achievement in drawing stainless, is described in this article.

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By **WALTER ELLINGBOE**

*Mechanical Engineer, Industrial Power Div.,
Milwaukee Works, International Harvester Co.,
Milwaukee*

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STAINLESS steel milker pails, to meet exacting sanitary codes, must not only stand up under prolonged use and sometimes abuse, but must not distort under 13 psi vacuum and must be completely free of pits, cracks or other surface defects or irregularities in which foreign matter or even microscopic contamination can accumulate. These conditions require stainless steel having good deep drawing characteristics and free from scratches, draw marks, inked trade symbols and other blemishes, especially on surfaces that will become the interior of the pail. Exteriors of the pails also must have no place where dirt can lodge. Joints at fittings must be filled with solder and fillets must be provided where bail ears and bottom hoops are fastened.

The steel used by International Harvester Co. in producing these milker pails is type 302 (18-8). Since first used for this purpose, the steel has been improved, especially in drawing properties and surface finish, with the result that fewer draws, fewer anneals, and a single bulging operation suffices to produce the required shape. Improved die construction, better draw compound and other refinements in manufacture have also helped to yield a superior product.

A blank and the work after each of four draws and after bulging are shown in fig. 1.



FIG. 1—Four draws and a bulging operation, as indicated by the parts shown here, are required to form a stainless steel blank into a milk pail. The bulging is accomplished by applying hydraulic pressure to the inside of the pail while it is held in a die.

Drawing and bulging are done in fast reverse, hydraulic presses. Fig. 2 includes a sketch of the draw die and shows the successive operations on the 50-lb milk pail, which has a 12.1 in. OD and is 13 $\frac{5}{8}$ in. high after bulging. This pail is drawn from a blank 27 $\frac{5}{8}$ in. diam and 0.040 in. thick. Blanks for the 70-lb pail are 31 in. diam.

With steel draw rings, about 2000 blanks can be drawn before ring repairs are required. It is believed this number can be increased with carbide ring inserts, but these are still in an experimental state.

Improvements in steel have reduced the number of draws required from five to four, and bulging that formerly required two operations is now done in one. It was formerly necessary to wash, anneal and pickle after each draw. Now these operations are needed only after the second and fourth draws, the latter being before bulging. Efforts are being made to improve annealing so that pickling will be eliminated.

Washing, chiefly to remove the draw compound, is done in a tunnel washing machine using a hot alkaline solution, followed by hot rinsing and drying at 200°F. Annealing requires 3 to 5 min at 2020°F. When cool, the drawn parts are rinsed in cold water and pickled in a hot 2 pct solution of hydrofluoric acid and then a hot solution of 10 pct nitric

acid. This pickling is followed by cold rinsing, brushing to remove all acid, and drying before redrawing or bulging.

Draw compound is applied with a rag before draw operations, which are performed at

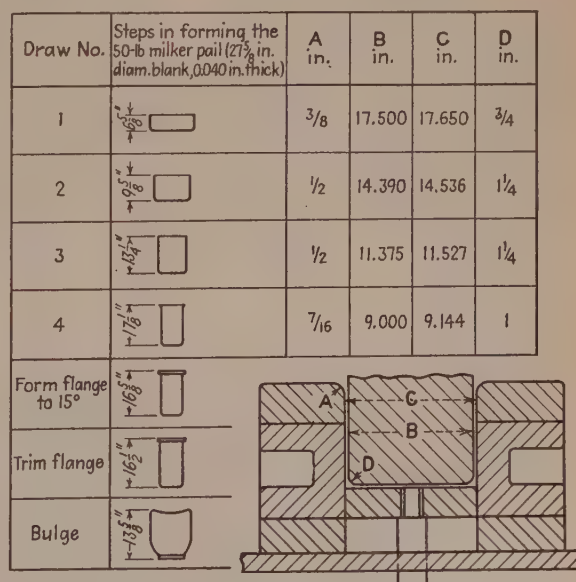


FIG. 2—Draw die details, as well as detailed data on the 50-lb pail after each operation, are shown here. A 27 $\frac{5}{8}$ in. diam. blank, 0.040 in. thick, is used.

an average rate of about 100 an hr. As fig. 2 shows, bulging follows forming and trimming of the 15° flange that the seal gasket rests against in the bulging press.

Bulging is done hydraulically in a die in which the pail flange is sealed by a leather gasket while the hydraulic fluid is pumped in. Clamping is done by cam-actuated segments that are forced in radially to provide the locking action as the die is closed. In locked position, these segments form the outside shape of the pail. Segmentary die construction is needed because, unless they are moved outward again when the die opens, the bulged part would not clear the die.

Bulging pressure is provided by the same motor and pump that operates the press. Liquid for bulging is forced inside the drawn part at 2500 psi, sufficient to expand the walls until they press firmly against the inner surfaces of the mating segments and the upper portion of the die. After bulging, the die is drained and opened and the pail shaping is complete. The production rate of the bulging press is about 90 pieces an hr, nearly as fast as drawing. Fig. 3 shows a drawn part being placed bottom up in the bulging die, the segments of which can be seen in open position. In the foreground are the hydraulic lines.

After bulging, pails are delivered to polishing stations, one of which is shown in fig. 4. The pails are fitted into rectangular bracket-

like fixtures that have trunnions in which the work can rotate in ball bearings about a horizontal axis while held in contact with the polishing wheels. The rough polishing wheel is a 16-in., 60-grit, cemented wheel having a 5-in. face, and is operated at 1750 rpm. The fixture rests on a vertical column at the bottom of which is a ball joint. This joint permits moving the fixture toward and away from the wheel, turning it about the vertical column, and moving it from side to side. These universal motions are necessary to bring into contact with the wheel all exterior pail surfaces to be polished. A cable running to the ceiling and across to a counterweight keeps the fixture from falling when being loaded and unloaded or standing idle.

The fixture permits the work to rotate slowly (about 50 rpm) about its own axis as polishing proceeds. This rotating is caused by the polishing wheel motion, but a brake prevents too fast a rotation. Also opposing rotating is a heavy leather strap or apron supported loosely by the fixture and position between the pail and the operator's body as he presses against the strap. Between the strap and the surface being polished is a sheet of corrugated paper board that takes the wear incident to the friction, and helps keep heat generated by friction from reaching the operator. The operator also holds the work against the wheel by using his hands to advance the fixture.



FIG. 3—Having undergone the final draw, the pail is placed bottom up in a bulging die in this hydraulic press. The cam-operated segments that move in radially as the die closes are shown in open position.

An identical fixture is used to finish polish against a finishing wheel of 120 grit. Operators polish for 5 min and shift to lighter work for the next 5-min period. About 10 70-lb pails per hr are polished on each wheel. Substitution of a belt polishing setup is being contemplated.

After polishing, pails have a lip rolled back in a spinning lathe, forming a flat face at right angles to the axis of the pail. This provides a seat for the cover gasket that seals the pail when in use. A 5-in. roll mounted on a cross-slide set at an angle does the spinning as the work rotates in a chuck to which the work is clamped by pressure of a disk against the inside of the bottom.

In finishing the interior, the pails are loaded with 50 lb of black marble chips, water and a special compound and rotated for 24 hr at 80 rpm in a jack while resting at a 5° angle on rubber tired rollers, one of which is driven. In

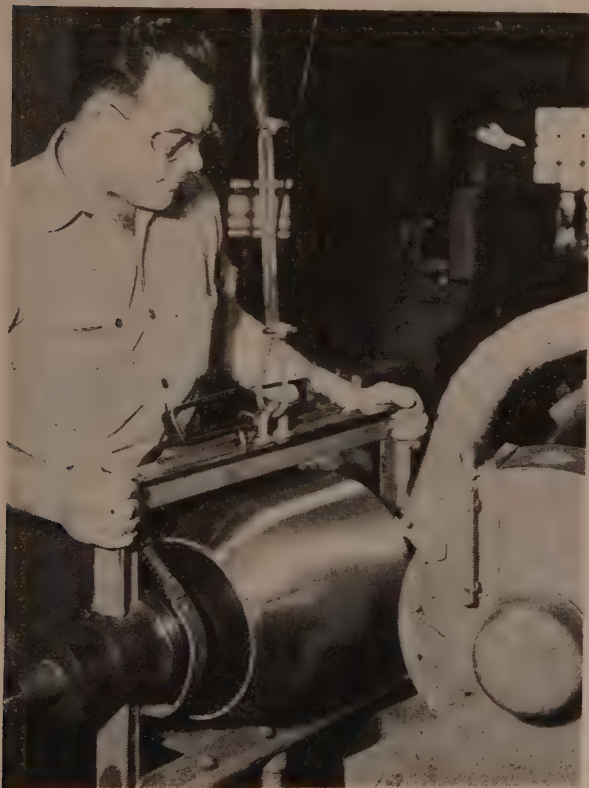


FIG. 4—In polishing the exterior of the milker pail, this fixture permits it to rotate slowly on ball bearings when brought into contact with a polishing wheel. The fixture is supported on a column resting in a ball universal joint.

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effect, the pail forms its own tumbling barrel, and the result is an extremely smooth but not polished interior surface. This is followed by ball burnishing for 5 to 8 hr with 150 lb of steel balls and another special compound in the pail. This ball burnishing produces an interior surface that is extremely smooth and of high luster. After thorough washing, pails undergo an exacting inspection to make certain no blemishes, especially on the interior surface, have been uncovered by the polishing action.



FIG. 5—Base rings are soldered to the pails after inside and outside polishing. This operation is performed in the fixture shown, which permits the pail to be turned slowly as soldering proceeds.

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The hoop or base ring of the pail is attached by tacking with 50-50 solder supplied in a triangular bar. This tacking is done in a vertical dial fixture. The hoop, also of stainless steel, is formed in a cam die from a strip 37 5/16 in. long x 1 3/4 in. wide, and is butt welded. Final soldering is done with a hand iron with the work in an inclined fixture made from pipe. The operator rotates the work slowly about its axis with his left arm as he holds the solder in his left hand and uses the iron with his right, as shown in fig. 5. This operation leaves a fillet of solder at the joint, avoiding any sharp corners that might catch dirt.

After applying the base ring, any excess solder and any burrs on the lip are removed in a speed lathe. Small stamped ears, provided with loops for the bail, are fastened to the pail by spot welding, but around the contour of each ear a solder fillet is placed. A stainless steel bail is then placed in position and a cover with a gasket completes the assembly. The resulting pail meets the exacting requirements of the milk industry and of sanitary codes, and renders long service.



FIG. 1—Cold ball headers make balls for bearings and other such uses. The smallest is 0.059 in. diam.



FIG. 3—On single-blow cold headers parts such as these can be made.

Modern Cold Forging

WHILE it may not yet be generally apparent, revolutionary developments have taken place in the cold forging field during the past few years. More basic progress has been made during the past ten years than during any similar period in the entire previous history of the industry. During this comparatively short time, previously existing machines have been outmoded and are obsolete. They have been replaced by basically new types in which only minor features of the older machines have been retained.

Because of infinitely greater rigidity, extreme accuracy of alignment and assembly to machine tool tolerances, these newer machines produce work of far greater accuracy and much better finish than heretofore possible. A completely new rocker-type heading tool shifter; a revolutionary design of oscillating cutoff and carryover mechanism; accurate balancing of moving parts; and

Developments in cold forging during the past ten years have completely outmoded and made obsolete equipment built prior to that time. Typical work that is regularly being done on these improved machines and cold forging processes are described in this article.

the use of anti-friction bearings insure continuous, trouble-free operation at high speed. As a result, the output greatly exceeds that ever before obtainable. In addition, the great rigidity, extreme accuracy of alignment, and positive die holding and clamp-

ing features make it unnecessary to pound the dies to obtain well filled upsets and, at the same time, insure freedom from tool and die interference. The result is a marked increase in die life. Further, the range of work now practical for cold forging production is almost unlimited. This is not only due to totally redesigned machines of past types, but also because of the development and introduction of radically new designs. These new designs include ball headers; roller headers; tubular rivet headers; transfer or progressive headers; boltmakers and nut formers.

Of major interest to the user of cold forged type products is the fact that these new ma-

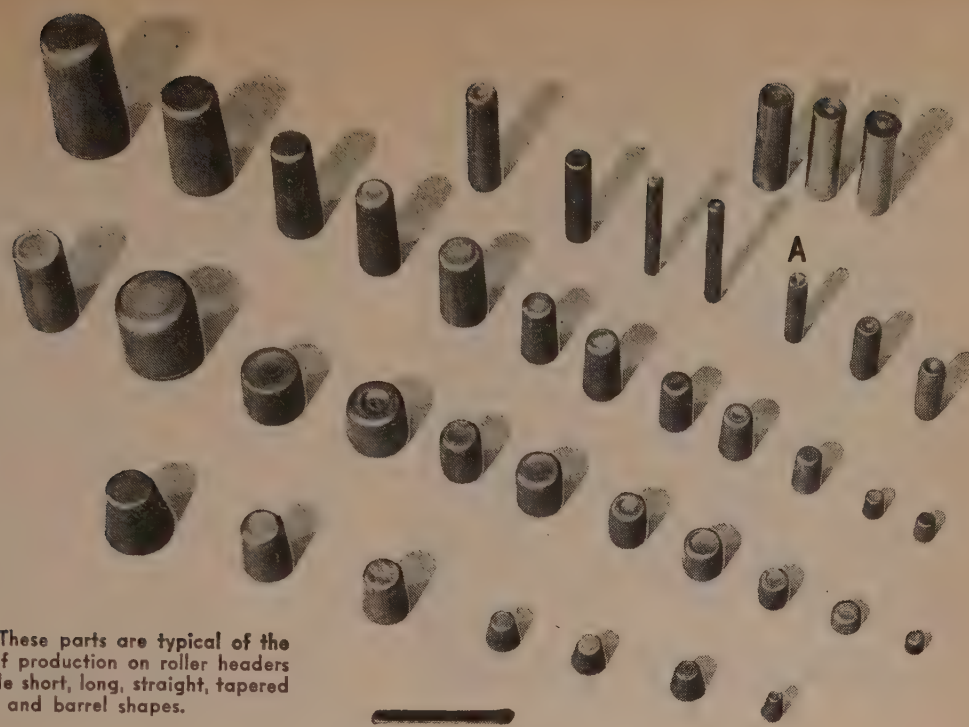


FIG. 2—These parts are typical of the range of production on roller headers and include short, long, straight, tapered and barrel shapes.

Practice . . .

By J. H. FRIEDMAN
Vice-President and General Manager,
National Machinery Co., Tiffin, Ohio

chines have so greatly widened the field, that almost the only limit to their application is the ability and ingenuity of the die designer. Examples of some of the more interesting products now being cold forged on a mass production basis will show not only what is now being done, but also the possibilities of utilizing this new equipment to marked advantage on many other types of jobs.

Fig. 1 shows typical balls now being produced on National cold ball headers. The smallest ball is only 0.059 in. diam. It is made from 0.046 in. diam wire at the rate of 400 per min. The balls are so small that it takes 111,000 to make a pound. This particular ball is used in a popular make of ball point fountain pen. This is a typical example of the microscopic work that is practical on a modern cold header. The larger balls in the group in fig. 1 are for bearings, grinding mills, and other uses, and illustrate the range of sizes being produced. The largest cold ball header produces 1½ in. diam balls at a rate of 80 per min.

The range of work being produced on National roller headers is indicated in fig. 2. The types

include short and long, straight, tapered and barrel shapes. In most cases both ends of the rollers are indented to provide grinding clearance and the radius is formed to finish dimensions. Concentricity of this radius is a specification. The diameter and length of these rollers are held to close tolerances, and, with the exception of tumbling and heat treating, no subsequent operations are required prior to grinding. Output on this type of work ranges from 55 to 400 per min, depending upon the size and type. Another type of part produced on a roller header is the hydraulic clutch assembly pin marked A in fig. 2. Both ends having first been indented on a header, the piece is ground and heat treated, and then one end is struck again in a re-header and the shoulder is formed.

An assortment of jobs being made on National single-blow cold headers is shown in fig. 3. Many jobs shown would have to be made on two-blow machines of older design, because these earlier machines were *springy*. The alignment was inaccurate and the cutoff so poor that the two blows were needed to produce satisfactory work.



FIG. 4—On double-blow cold headers the range of size of parts possible is great. Forming and upsetting such as shown here are possible.

are made from nonferrous and even precious metals, such as chromium, nickel, silver, gold and platinum. Work must be held to low tolerance limits to use as little material as possible and to facilitate assembly and inspection of the finished products. Some of these forged parts are so tiny they resemble grains of sand to the naked eye and are usually viewed with the aid of a magnifying glass. Since the product of a machine cannot be more accurate than the machine itself, it is obvious that this type of work demands precision. Even to the experienced cold header man this type of work is an ever increasing source of wonder because of the extreme accuracy involved and because the modern cold header handles it on a daily mass production basis.

The second group of two-blow cold header work is shown in fig. 5. The sequence of operations of bolt blanks is shown, the heads of which are subsequently trimmed square or hex on separate trimming machines. The first operation in each set is the blank after it is sheared from the wire; the second is the blank after the first or coning blow; and the third is the final operation as produced on the second blow. In the modern cold header, improved cutoff contributes to even distribution of the stock in



FIG. 5—Progressive stages formed on double-blow cold headers are shown here for different shaped bolts. The first operation is shearing, second coning and the third is final forming.

Equipment is now available for producing single-blow work up to $\frac{3}{4}$ in. diam x 8 in. long under the head with output ranging from 70 to 400 pieces per min, depending upon the size of the job.

Modern double-blow cold headers are versatile. They not only produce a wide range of work but produce it better and faster than units of older design. The following ten different groups of work indicate the variety of parts that can be made on present day double-blow machines.

The first group is shown in fig. 4. This assortment of small two-blow work is produced at a rate of 250 pieces per min. Some parts shown are contacts for various electrical devices and

the head. The cone is accurate in shape, uniformly filled and central with the shank. This permits a final upset in which the head is central and the metal uniformly distributed with relation to the shank. Providing extra stock to insure that all sides of the head will *clean-up* in the trimming operation is not necessary. This results in a saving of material in the form of reduced trim scrap. Output on this type of work ranges from 45 to 250 pieces per min.

Fig. 6 is a miscellaneous assortment of two-blow carriage bolts, step bolts, plow bolts, clamp bolts, and the like. They have central heads, even though some are large and difficult to make. There is no flash and the squares under the heads are sharp and well filled.

Equipment is available for producing this type of work in all sizes up to $\frac{3}{4}$ in. diam x 8 in. long, and output ranges from 45 to 250 pieces per min. While there is nothing unusual about this type of cold headed work, there is a vast improvement in the quality, finish and production rate of the modern machine.

Cold headed parts from forgeable nonferrous metals are produced on these machines in ever increasing quantity and variety. An assortment of such jobs is shown in fig. 7. Included are parts made from copper, brass, aluminum and other nonferrous alloys. These parts range from brass valve stems to copper electrical terminals. One job shown that is especially interesting is the copper blank at *B*. This blank was produced from copper wire on a 5/16 in. two-blow header at a rate of 125 pieces per min. The blank produced on the header was subsequently drawn into the radiator tube shown at *C*. To meet the requirements for accuracy in the drawing operation, concentricity of the hole in the blank was important. Maximum runout mea-

sured on a mandrel was held to under 0.002 in. The tube into which the blank is drawn is 9 in. long and the wall is only paper thick. It is obvious that the hole in the blank must be accurately centered, otherwise the wall would vary in thickness to such an extent as to cause weak spots in the tube and subsequent failure. The copper wire terminal, *D*, the copper electric motor commutator segment, *E*, the aluminum stop nut, *F*, the brass valve stems, *G*, and the other products shown in this group are typical of the variety of cold forged shapes possible on modern two-blow headers.

The modern double-blow cold header is versatile enough that in some cases it can function as a three-blow machine. This three-blow performance is possible because the design of the modern machine, along with some ingenuity of die design and handling, permits two operations simultaneously on the second blow. Parts shown in fig. 8 are examples of this unusual category. They all required three operations, but were made on two-blow machines. The third operation is practical because of the rocker action for shifting the coning and finishing tools makes it possible to retain the blank on or in the heading tool, depending upon the job, and transferring it with the heading tool to the third stage and completing it on the next coning stroke. The result is a three-blow operation at a two-operation production rate. A variety of ingenious mechanisms make such procedures possible. For example, in some cases an aspirator holds the blank on the tool. On other jobs, where a portion of the job is formed in the heading tool, ejection does not take place until the third operation is completed. In still other cases, devices of different types are available. Jobs like the lock nuts shown as *H* in fig. 8 are handled with an aspirator, while work like the clinch nut, marked *I*, is



FIG. 6—This assortment of carriage, step, plow and clamp bolts can be made on double-blow machines.



FIG. 7—Cold headed parts from nonferrous metals can be made on double-blow type machines. Part *B* is the copper blank subsequently drawn into radiator tubes shown as *C*. The copper wire terminal *D*; the copper electric motor commutator segment *E*; the aluminum stop-nut *F*; and the brass valve stems *G* are typical of the variety of parts possible on these machines.

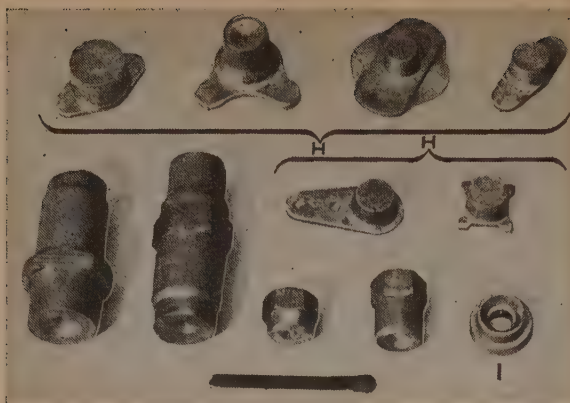


FIG. 8—Functioning as a three-blow machine, a double-blow cold header was used in making these parts. The technique of using two-blow machines for three-blow operations is described in the text.

handled by ejecting it from the heading tool after the third operation. Many mass production jobs can be made by these methods and the examples shown may be sufficient to disclose the possibilities.

Figs. 9, 10 and 11 show parts that involve an entirely different application of the product from the cold header. On this type of application, the mass production possibilities of the header are utilized in making preparatory blanks for subsequent finishing on other equipment, such as presses, trimmers, forging machines and screw machines. The wheel nut, fig. 9, for a popular make of truck shows what can be accomplished by the cold header teamed with a Maxipres, a National forging press. The samples show the progress of the development from a screw machine job to a combination cold header and hot forging press job. The two pieces at the left



FIG. 9—The two pieces at left show a blank and finished wheel nut made on a screw machine. The center group shows the nut made by producing a preparatory blank on a screw machine and forming the flared end on a cold header. The group at right shows the technique that was finally used. The preparatory blank shown in the middle of the group was upset on a cold header and then heat treated and forged for final machining.

FIG. 10—This tie rod end is a sample of teaming cold heading and forging. The blank at left was made on a cold header, and at the same time the reduced end for threading is extruded. The large end of the blank is then induction heated and finished forged.



FIG. 11—By upsetting and extruding the length of stock at extreme left through a four-station progressive cold header and then upsetting the center, hot trimming and machining, the segment gear shown at right is produced.

show the blank and finished nut as made on a screw machine. In this case the material required is 18 oz. The center three pieces show the nut made by producing a preparatory blank on a screw machine and forming the flared end on a cold header. The amount of material required was reduced to 12 oz. The three pieces at the right show the way the nut was ultimately produced. The preparatory blank shown in the middle of this group was upset on the cold header with a capacity of 3300 blanks per hr, and only 6 oz. of material were required for each nut. The preparatory blank was then heated and hot forged ready for final machining and threading. This nut is hollow, but it is unnecessary to perform a drilling operation when it is produced by this technique. Furthermore, the square end had

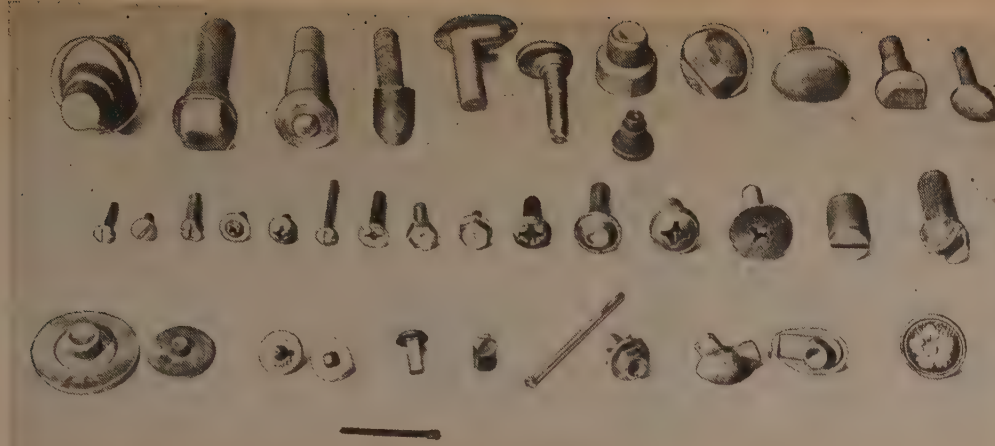


FIG. 12—These unusual jobs are produced on two-blow headers. Off-center shapes, odd shapes, and parts requiring uneven distribution of stock and slots are possible on this type equipment.

to be milled and stamped with the letters "L" or "R" by the old method. In the National method the metal from the hole is displaced into the forging, eliminating the drilling and saving the

and further loss of material. The job is then pickled and sandblasted, and only a minimum of machining is necessary to complete the nut. Not only are the savings of machining and material

FIG. 13—On a universal type two-blow machine, which combines solid and open die construction, long shank parts such as these can be produced.



material. Also, the square is formed and the letter embossed in the hot forging operation, thus saving a milling and stamping operation

important, but added to these savings are those gained from augmented production rates.

The National cold header produces the nuts from the coil at the rate of 50 per min. The hot forging operations are easily handled by the Maxipres at a rate of 1000 per hr.

The tie rod end, fig. 10, is another job that is ideal for production on a cold header teamed with a forging press. The cold header produces the preparatory blank shown at the left. The reduced end for threading is extruded on the cold header at the same time that the semi-spherical end is upset. This semi-spherical end of the blank contains just enough stock for the cup. The large end of the blank is induction heated and finish forged on a press. The blank made on the cold header is held to such accuracy for size and shape that the final forging is filled at every point without excess stock. The only material wasted is the small slug trimmed from the bottom of the oblong hole. Subsequent trimming or grinding preparatory to final machining is unnecessary, and only a minimum of stock need be removed during machining.

Still another example is the segment gear shown in fig. 11. By upsetting and extruding the length of stock at the extreme left to the shape shown next to it in a four-station progressive cold header, an ideal blank is produced



FIG. 14—These rivets were produced on two-blow tubular rivet machines from solid wire. The rivets are pierced by cold forging on the header, and drilling is eliminated.

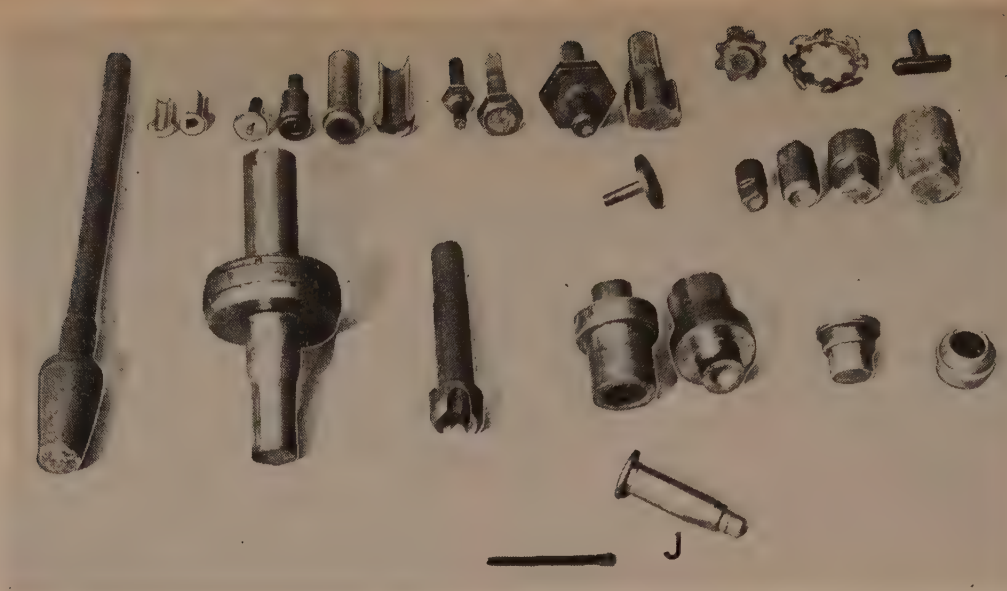


FIG. 15—Work involving double or triple extrusion or multiple heading operations can be done on progressive or transfer-type headers. An unusual job is shown at J. This part, a regulator core, has seven different diameters.

for the making this part. The length of stock with the upset in the center is hot trimmed on a press, after which it is machined into the finished part shown on the extreme right.

The parts shown in fig. 12 are unusual jobs produced on modern two-blow headers. Off-center jobs, odd shapes, parts requiring uneven distribution of the stock and struck slots are possible on modern machines.

Fig. 13 shows work produced on a type of two-blow machine known as a universal header. This machine is a combination solid and open die design and is used in plants where some of the jobs produced have shanks too long in relation to their diameters to be ejected from a solid die. Combination solid and open dies, open dies, or solid dies may all be used in these machines. When equipped with open dies it is operated as an open die machine. When equipped with solid dies a simple adjustment enables it to function

as a long stroke two-blow solid die header. All of the work shown was made with split dies. Open die work produced on this radically different machine is hardly distinguishable from solid die work. Because of the rigid grip the parting line of the die leaves only a faint mark. Outputs range from 45 to 250 bolts per min, depending upon the size of work being produced.

Rivets from Solid Wire

The rivets shown in fig. 14 were produced on recently developed two-blow National tubular rivet machines. These machines, available in several sizes, make rivets from solid wire, and the rivets are pierced by cold forging on the header. Elimination of drilling saves material and machining time. The head is central and well filled, and the pierced end is square, thus facilitating the riveting operation and giving a better, nicer looking job. The output ranges from 100 to 160



FIG. 16—The boltmaker, a transfer-type machine, in addition to extruding and heading, can also trim, point, and thread. By a double extrusion process it produces bolts and cap screws with the product completely finished as it leaves the machine. Samples are shown here. The operations sequence of a hexagon head screw is shown at K.

rivets per min. Either tapered or straight hole rivets can be made equally well and any reasonable depth of hole can be attained.

The parts shown in fig. 15 were produced on Progressive, or Transfer-Type headers. Work involving double or triple extrusion, or multiple heading operations where two or more different die impressions are necessary is especially suited to this type of equipment. A finished part is produced on each stroke, regardless of the number of stations required. These machines are available in a full range of sizes and each size can be furnished with the proper number of stations—from three to five—to suit the work to be made. Output ranges from 50 to 110 pieces per min, depending upon the size of the work. An unusually interesting job is shown at J. Destined to be a regulator core, this piece has seven different diameters.

Hexagon Head Capscrews

Work produced on a type of machine called the National Boltmaker is shown in fig. 16. This is a transfer-type machine. In addition to extruding and heading, it trims, points and threads. It produces bolts and capscrews by a patented double extrusion process, and the product is completely finished when it leaves the machine. A set of operations of a hexagon head capscrew is shown at K. The operational sequence consists of cutting off, first extrusion, second extrusion and upsetting the head, trimming, pointing and roll threading. These operations are carried on simultaneously, consequently a complete bolt or capscrew is made on each stroke. The machines range from 3/16 to 3/4 in., and each size can be tooled for several different diameters and adjusted for a wide range of lengths. Output ranges from 50 to 100 pieces per min. The work produced is of excellent finish, the accuracy meets the most rigid requirements; and by virtue of the cold working, the product is much stronger than the wire from which it is made. Parts other than bolts are also being made on this equipment.



FIG. 17—Nuts, such as shown here, are produced from coiled wire or rod on cold nut forming machines. The only waste is a small slug from the hole and a nut is produced on each stroke of the machine.

A recent development in this field is a line of cold nut-forming machines that produces nuts from coiled wire or rod. The nuts shown in fig. 17 are representative of the class of work that these new machines can produce with excellent finish and accuracy. Since the nut is cold forged to shape, with most of the material from the hole entering into the nut, the only waste is a small slug from the hole. This machine is similar in design to a transfer header, and the entire series of operations is carried on simultaneously, a nut being produced on each stroke. The machine produces a variety of nuts ranging in size from 1/4 in. USS to 1 in. USS and 1 1/4 in. SAE. The outputs range from 40 to 100 nuts per min, depending upon the size. The application of this machine is not necessarily confined to the production of nut blanks, and the future will witness the tooling of these machines for the production of other mass production parts on this most recent cold forging development.

Sampling Openhearth Slags at Varying Depths

A DEVICE permitting the obtaining of several slag samples simultaneously at different levels in the openhearth furnace is described briefly in the *Engineers' Digest*, September, 1948. Tests carried out in Russia with this device are said to have revealed interesting data relating to the heterogeneity of the slag throughout its depths.

The equipment used consists of several steel pans which are attached to a common spindle. The distance between pans can be varied by threading loose sleeves over the spindle between the pans. To prevent the slag from entering the pans near the top, these are covered with a thin copper foil which subsequently melts with the

heat of the slag, permitting the latter to fill the pans simultaneously at different levels and to solidify. Copper is selected for the foil because it is not easily subject to oxidization and therefore does not influence the composition of the slag samples.

During withdrawal from the slag, slag from the top level collects on top of the pans and this is consequently removed, leaving the pans filled to two-thirds of their depth. Further improvement can be made by tying washers on copper wire above the pans. When the copper wire melts, the washers fall on top of the pans, thus assuring that the slag is only collected at the desired levels.

Increasing emphasis on job security is making it imperative that future industrial hiring policies take into account personality factors, as well as skill factors. This article discusses the effect of personality factors on production rate, efficiency and employee morale. Examples are given of the role personality plays in the performance of specific jobs.

Personality Factors in Future

By I. A. BERG

*Associate Professor of Psychology,
Northwestern University,
Chicago*

AT present, if an employee is hired and later found to be unsatisfactory for reasons of personality or skill, it is usually possible to rectify the error by letting him go. Such employment mistakes are expensive, but the present cost is trifling compared to *what it is going to be*. It is increasingly clear that employees are becoming anchored to their jobs—anchored by law and by public opinion. More and more plant management is faced with the choice of losing money by keeping an unsatisfactory employee or losing money by letting him go. In some cases the latter alternative is virtually impossible.

This current trend of promoting job security has been most apparent in labor organizations for some years past, and such labor group activity will undoubtedly increase. But additional pressure is gathering in unexpected areas. The retail merchant, for example, is becoming aggressively conscious of the fact that the steadily employed worker incurs fewer bad debts and is more willing and able to purchase deferred payment goods. Existing state unemployment compensation laws which favor the company

with smaller labor turnover will be strengthened and extended in the future.

Apart from such pressures, management representatives will want such labor stability anyway because it makes for lower cost production and because the best workers gravitate toward the company with the most stable employment conditions. While it is now highly desirable to select employees who will fit in and remain with the company, it will be imperative to select such employees in the future. But future selection cannot be effected if limited to job skill alone, although certain changing requirements of skill will have to be included in the basis for selection. The most important emphasis in the future will be on *personality*.

In 1937, a study of 4000 discharged office workers showed that 90 pct of the reasons for discharge concerned personality factors as carelessness, dishonesty, tactlessness. Only 10 pct of the discharges were due to deficiencies of skill. But while the importance of personality traits in white collar jobs was well recognized, little significance was attached to the equal importance of shop employees who fitted in as personalities.



Employee Selection . . .

Part of the reason for this failure to consider the importance of personality in the shop was based upon the admitted fact that the shop worker does not meet the public directly and his contact with fellow workers is necessarily restricted. As one foreman put it, "The most important thing is that worker gets along with his machine." Of course, any line supervisor could cite instances of worker personalities which were unsuited to a given work situation, but he dismissed such employees as weak sisters, agitators, or screwballs, depending upon the nature of the difficulty or personality clash. And he got rid of them, sometimes by outright discharge, sometimes by making things so difficult that the employee was glad to quit, and sometimes by transferring the misfit to some other, unsuspecting department.

Since it is not convenient to solve the problem of the future maladjusted employee, the only recourse is to revise selection procedures so that: (1) The generally maladjusted persons are eliminated *before* hiring and (2) by examining the personality requirements of the various jobs and then choosing workers who will meet those requirements.

The initial work which has already been done in looking more closely at personality demands has paid dividends. One department store, for example, found that a number of their saleswomen were unsuccessful because they paid too

much attention to such tasks as meticulous arrangement of the merchandise and too little attention to the customers. But the personality traits which interfered with successful sales work were those which made for distinct success when the unsatisfactory salesclerks were transferred to jobs as cashiers. Similar personality factors are involved in the oft-encountered tug-of-war between a company's disbursing officer who typically enjoys exactness and orderly detail, and the salesman who loathes detail and, consequently, is content to list half his reported traveling expenses under "miscellaneous."

Supervisors are more acutely aware of this developing emphasis of the importance of personality in certain job categories. While this awareness of the role of personality has not extended very far, its significance is recognized as overshadowing the importance of job skill or aptitude in many instances. Gregarious persons, for example, are poor employment risks when assigned to monotonous or solitary jobs. Their attention wanders frequently and they take unwarranted amounts of time off for social visiting. But such gregarious employees often fit in well on gang labor jobs where cooperation is required. If they have participated in team sports as baseball or football, they are quite likely to enjoy and perform well on group-effort jobs. Similarly, boastful persons or practical jokers are more dangerous than a blowtorch in



**EMPLOYEES ARE BECOMING
ANCHORED TO THEIR JOBS**

the explosives storeroom when they work on open-blade or open gear machines.

Of course, the line supervisor is aware of these personality factors and of the importance they have for job success. The supervisor has other categories of personality-problem workers such as the "chronic moaner" who disrupts the work of others, the "drifter" who moves from one job to another, and the aggressive "chip-on-shoulder" employee who must always be given the velvet glove treatment. Significantly, while such evaluations indicate a greater awareness of the role of personality in relation to the job, the evaluation is cast wholly in negative terms—those *who do not fit in*.

Positive Evaluation Needed

The currently developing emphasis is shifting toward a more positive evaluation of what makes an employee suitable and less of what makes him unsuitable. The factors influencing this change are the very factors that have worked well when applied. For example, how would any personality react to working at a job which most people regarded as being menial, dirty, and capable of being performed by any simpleton? At a large institution that was the prevailing opinion of the work done by the janitors. Because of the low esteem in which they were held and for other reasons, the janitors were restless. Turnover was high and morale was low. There were no specific demands, as for wage increases, but complaints, often of a trivial nature, flooded the plant department. The janitors complained that many of the other workers called them all "Tony" in much the same jocular spirit that sleeping car porters are called "George." They resented other workers telling them to clean up in the corners, which admonition, if jokingly given, was nonetheless galling.

Personality reactions were clearly involved in this situation; hence it was recognized that the personality involvement must be dealt with directly. Accordingly, a twofold attack on the

problem was initiated. The first was educational in nature. At the next meeting of department heads, the dissatisfaction current among the janitors was described and an outline of the work of the janitors was given. The dirt-chasing features of the job were minimized and the responsibility aspects stressed. It was pointed out that this group had to be fully as honest as the personnel of the payroll and cashier's department; for valuable articles were often left in offices and unlocked desks. Also, an unreliable janitor could cause considerable damage by failing to turn off or turn on certain valves and motors at the time required. The department heads were asked to impart this concept of the janitors' service to their subordinates. Also, a story was run in the plant paper about the janitor's job, only he was called a *custodian*. The janitorial staff was thenceforth officially referred to as custodians, and their buff-colored shopcoats were supplied with labels over the breastpocket bearing the word Custodian. Gradually, the irritating joshing of the janitors became less until it virtually ceased as the more accurate concept of their function was publicized. The janitors' complaints also dwindled. It seems clear that a serious disruption of work was avoided by this recognition of the role of personality factors in job adjustment. Such examples are becoming more numerous as the current trend develops.

Fitting the Personality

Different jobs represent different pressures, and for maximum job adjustment, hence job efficiency, the personality must fit the job. The repairman often likes his job because "there is something different coming up every day;" and he wonders why the worker on the conveyor belt doesn't go crazy because of the monotony. The conveyor belt worker, on the other hand, may remark that repairman's job would drive him wild because he never gets one thing finished before something else pops up and things never get settled. The same personality factors apply to promotions. Jones, for example, has been a faithful lathe operator for seven years. He understands his job and the broader routine of the department thoroughly; and he has always been conscientiously reliable. So when a foreman's job is open in his department, he is chosen as the logical person. In another man, this promotion would have represented a challenge, causing him to work hard with the hope of eventually meriting a superintendent's office. But it doesn't affect Jones that way. He feels insecure because he is now responsible for the work others are completing, not just his work alone. Where he previously was friendly and tolerant, he now annoys many of the men under him by frequently checking up on them and by warning them frequently to avoid certain errors of which they are fully aware. Jones never feels safe when he delegates authority, even for relatively trifling tasks; so he begins to stay late at the plant in a vain effort to do everything himself. Often he returns to the plant late at night to make sure that the men on the night shift have things ready for the morning gang.

At this point any one of a number of things may happen. The grumbling of the men under Jones may be heeded by the superintendent, and Jones is returned to his job on the lathe. Or there may be a wildcat strike. Or Jones may learn that by visiting the corner tavern, he is able to forget temporarily his concern for the job. Eventually, his tavern visits are not so brief, nor are they confined solely to evenings; and Jones winds up a chronic alcoholic. It may be noted in passing that just as many alcoholics are probably produced by such assumption of responsibility which a personality like Jones' is unfit to bear, as are produced by domestic discord.

In the case of an unsuitable supervisor, the condition can be remedied because it is usually possible to return him to a line job. But before the misfit supervisor is discovered and returned to the line, he can prove to be extremely expensive in terms of lowered worker morale and in terms of employees who quit because they can get other jobs where they do not "have to put up with that guff." How much simpler it would have been if this personality weakness in Jones would have been detected before he was promoted.

So the concept of job efficiency must be broadened to include personality factors as well as quality and rate of output. As an example of how high output may sometimes have unwanted reverberations, the case of Johnny Seabiscuit may be considered. He was called Johnny Seabiscuit in derision by his fellow workers in a ball bearing grinding department because Johnny, like the famous racehorse, was a speed demon. A university engineering student, he took a summer job grinding bearings as a means of financing his education and getting some practical experience at the same time. He proved to be a natural for the job. There was something in his perceptual coordination plus an inborn mechanical aptitude that enabled him to reach a top level of skill and output almost at once.

A Typical Problem

The second day that he was there he announced that within a week he would be producing more than any of them. When this assertion was greeted with catcalls and laughter, Johnny grinned cockily and said, "Wait and see." And he did it. On the fifth day following, he was credited with about 10 pct more inspected bearings than the man who was usually the top producer. Johnny then announced that in a month he would grind twice as many bearings as any of the old fogies there, but the word he used was more insulting than fogies.

The men in the grinding department, it is true, were not working at their top level of efficiency; however they were working at an optimum level. They had arrived at an individual rate of production which resulted in the fewest inspector's rejections and which was acknowledged to be an above-average rate when compared with similar plants. The men were considerably older than Johnny and rather

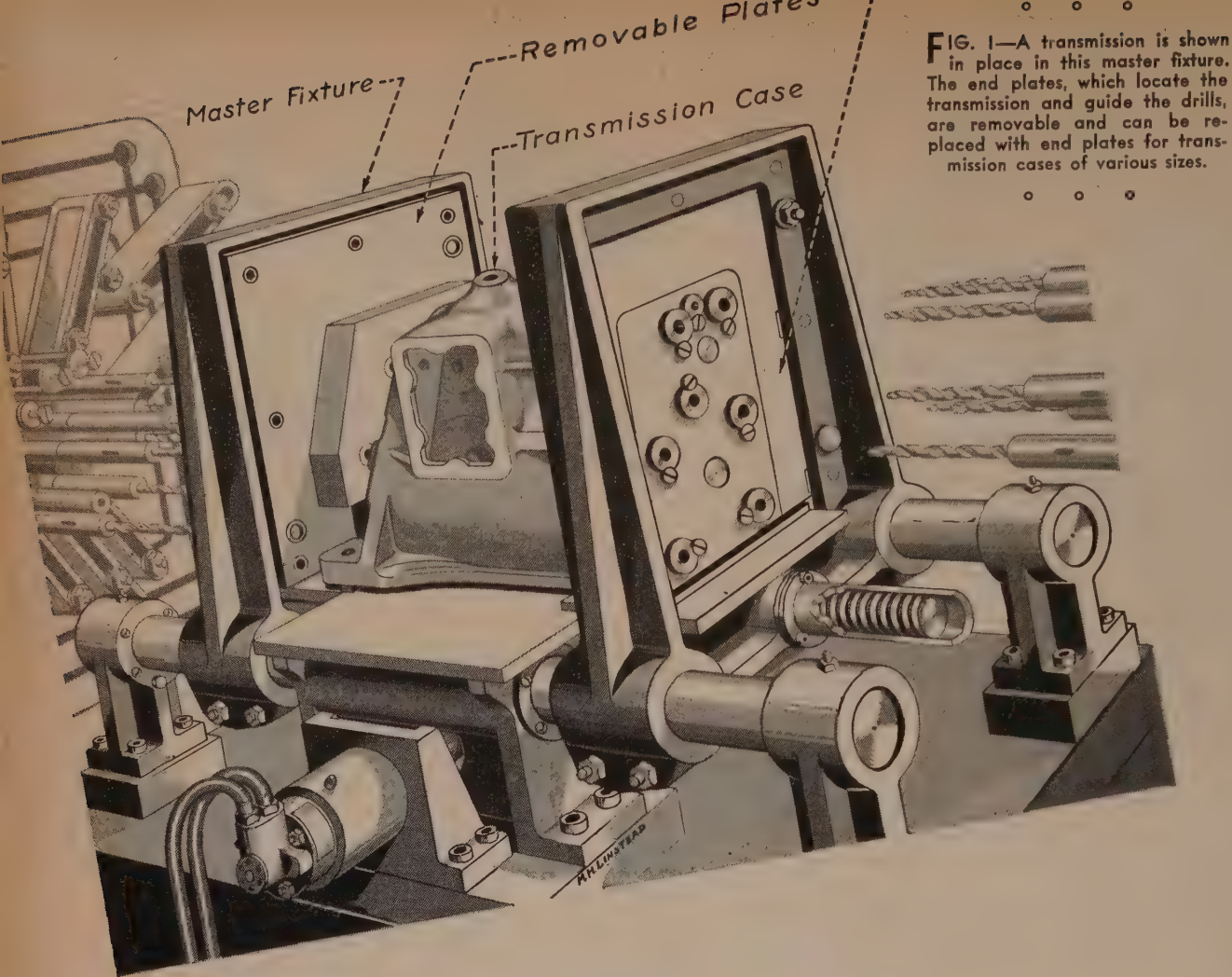


settled in their ways, but they could not take Johnny's humiliating challenge without attempting retaliation. Several of the top men speeded up their production successfully; but when they pushed themselves still harder, since Johnny was still ahead of them, they burned so many bearings that the department head came down to investigate the situation when he saw the inspector's report.

The department head observed that the top man in output had the best inspection record—Johnny again. So other tactics were used to bring Johnny into line. His machine began to break down often, and somehow, the breakdowns usually occurred after he had returned from lunch or from a visit to the washroom. Since he was easily baited, several of his co-workers would periodically take time out to tease him in the hope of slowing him down. Their own output suffered, of course; in fact, the total departmental output dropped about 7 pct. In consequence, Johnny never made good his boast of grinding twice as many bearings as any of the old fogies. His production stabilized at about that of the other top man in the department, however he was producing more than he was credited with. His fellow workers would occasionally steal a tray of his completed bearings to swell their own output figures. All of them saved their more obviously burned bearings to insert furtively in Johnny's trays for the inspector to reject later, to Johnny's discredit. After Johnny quit to return to college, the department gradually settled down, and output rose to its previous level.

Here is a case where output as a measure of the efficiency of one individual is inadequate. Taken by itself, Johnny's output would give him a top ranking, but the personality clashes he produced would earn him low marks in efficiency because of what happened to the output of others. Curiously enough, the immediate supervisor was aware in a vague sort of way of what was going on; yet he looked upon Johnny Seabiscuit as a healthy ferment which would inspire some of the other grinders, as he approxi-

(CONTINUED ON PAGE 116)



Economies of Interchangeability

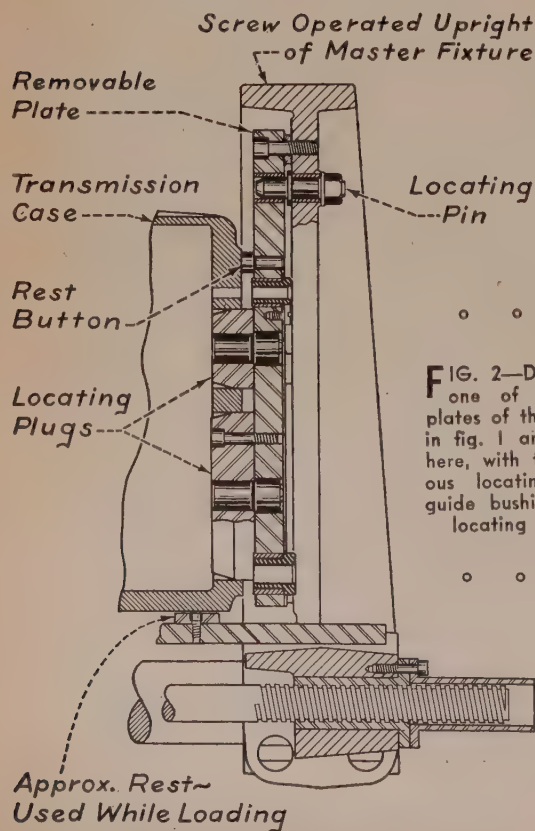
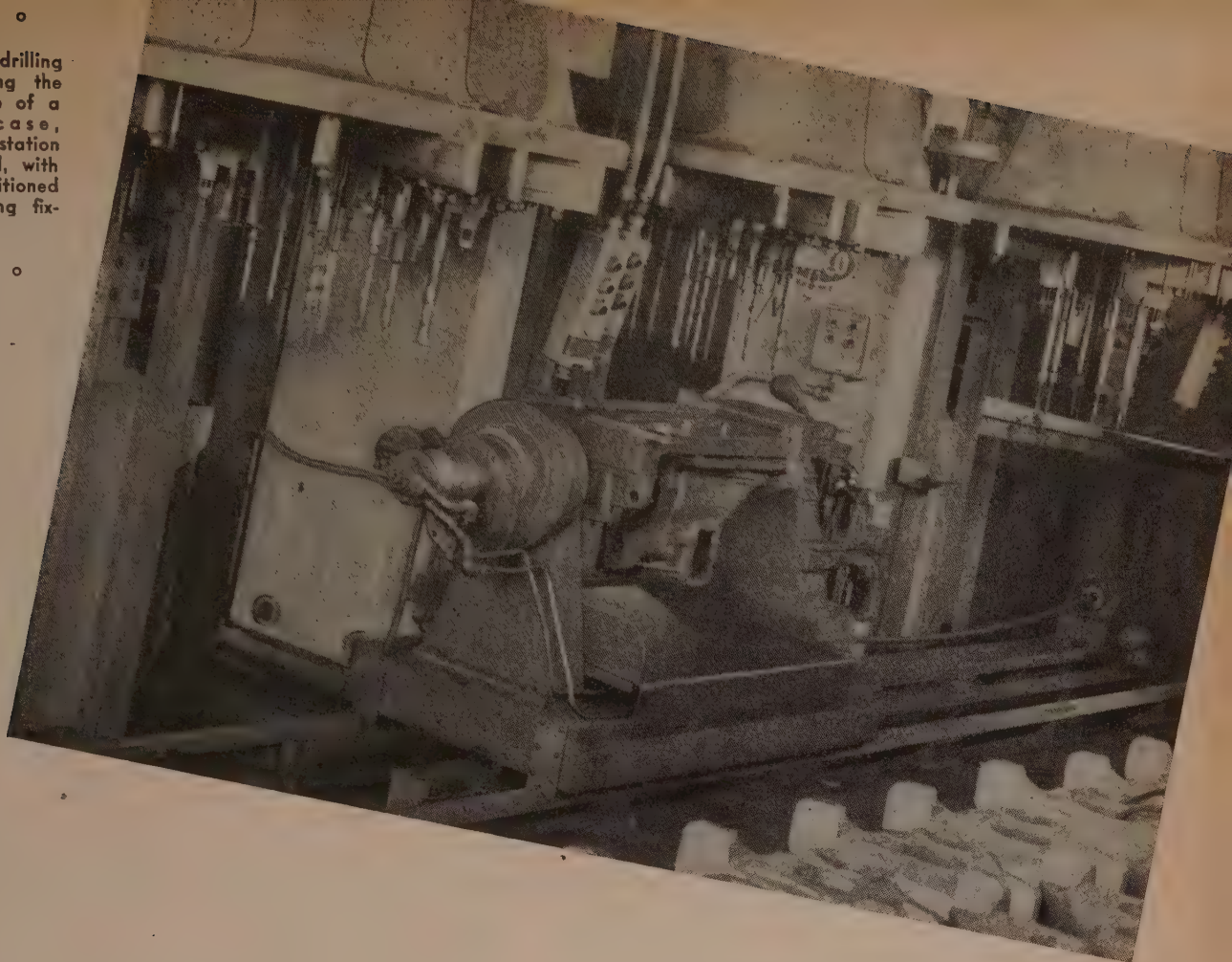


FIG. 2—Details of one of the end plates of the fixture in fig. 1 are shown here, with the various locating pins, guide bushings and locating plugs.

By PHIL LINDHUBER
Chief Tool Designer,
Spicer Mfg. Div., Dana Corp., Toledo

WHEN manufacturing parts for transmissions and clutches used on buses, trucks and tractors, a large variety of small lot parts that are similar in shape are generally scheduled on one production line. Changeovers from one part to another unfortunately entail tying up a large amount of capital equipment and many man-hours in non-productive time. Changeover costs are tremendously affected by the versatility of the tooling and machinery that is placed in the machining line.

G. 3—For drilling and tapping the surface of a transmission case, a three station setup is used, with part positioned in a traveling fixture.



n Jigs and Fixtures . . .

Universal jigs and fixtures, so designed that they can be easily and quickly changed over to suit a large number of similar parts for machining, has resulted in tooling that reduces idle machine time and maintenance costs, meets production requirements, keeps quality standards high and frequently lowers tooling costs per unit on small lot production to a level comparable with that of a similar product produced at a continuous production rate. Typical fixtures of this type are described in this article.

Whenever confronted with tooling problems of this kind, the Tool Engineering Div. of the Spicer Co., Toledo, places considerable emphasis on universal type fixtures that are quickly and easily changed over to suit a multiplicity of parts.

Universal type fixtures in this plant are usually made up of fixtures that consist of one master fixture that may carry any number of removable details such as work hold-down clamps, locating plugs, rest plates, rest buttons, jig leaves or entire sub-fixtures that serve

the dual purpose of locating and clamping the work.

In order to accomplish this interchangeability of fixture details, certain deviations must be made from ordinary fixture designing practices. For instance, terms such as slip-fit, slip-fit no-shake, wring-fit, locate at assembly, grind at assembly, are left off the tool drawings, and in their places decimal dimensions are used. With a view towards economical tool building, decimal dimensions carry working tolerances as liberal as is permissible when taking into

Adjustable Locating
and Hold-down Unit—
Part of Master Fixture

Expander

Transmission Case
in Loading Position

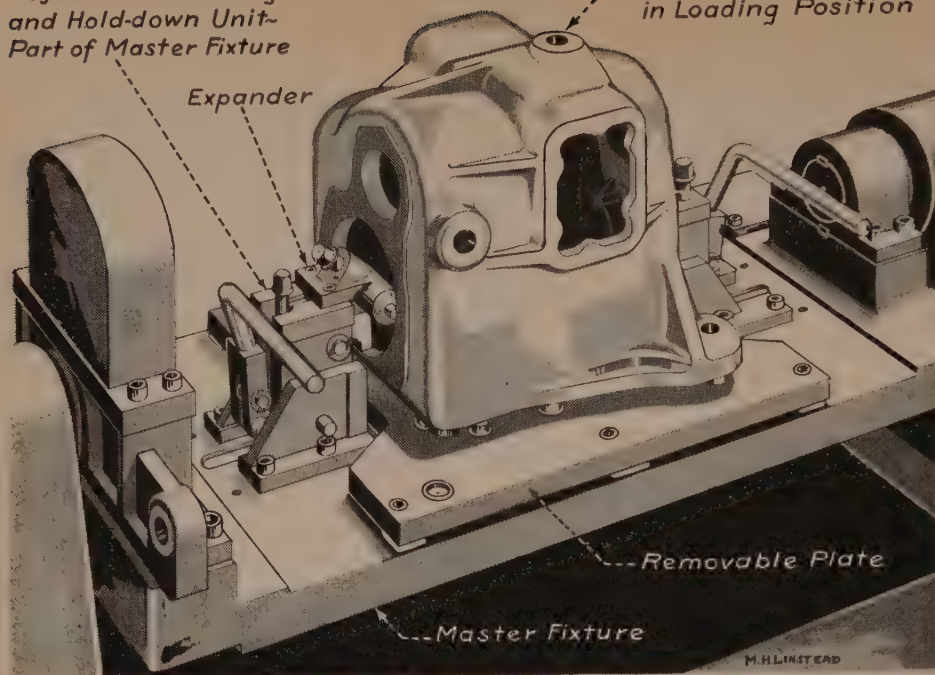


FIG. 4 — Transmission cases machined on this traveling fixture vary as much as 8 in. in length, 10 in. in height and weigh from 30 to 120 lb. The fixture stops automatically in proper machining position, rotates the case to remove chips from the holes, and handles cases of various sizes.

consideration some normal wear in the tool and the required accuracy to be put into the product. Also, in order to minimize wear and assure maximum accuracy at all times, swing jig leaves are equipped with hardened wear buttons on all locating and resting surfaces. Hardened hinge pins fit into hardened bushings. Removable bushing plates such as are shown in some of the accompanying illustrations are located on the master fixture by means of two accurately spaced holes in the plate and hardened pins in the fixture. All holes that receive hardened locating pins or removable plugs used for locating the workpiece are bushed with hardened liners. Using decimal dimensions instead of the customary fitting practices has, incidentally, also largely simplified the maintenance of fixtures. Whether details are to be built for new additional work or for replacing worn out ones, they may be placed with any tool building source. This eliminates the expense and fixture tieup of removing the fixture from machine and sending it to the tool room for detail fitting.

Extreme care is exercised that all removable details are properly stamped with the tool and detail numbers, and listed on operation sheets. Tool crib attendants carefully follow copies of the operation sheets when determining which details must be issued to the line during setup.

Figs. 1 and 2 show a typical master fixture, complete with removable details, mounted on a double-end drilling machine. This fixture is equipped with an air motor that brings upright plates viselike against the ends of the transmission case to be drilled by means of right and left hand screws. The removable details consist of two plates holding all the necessary bushings for guiding the combination drilling

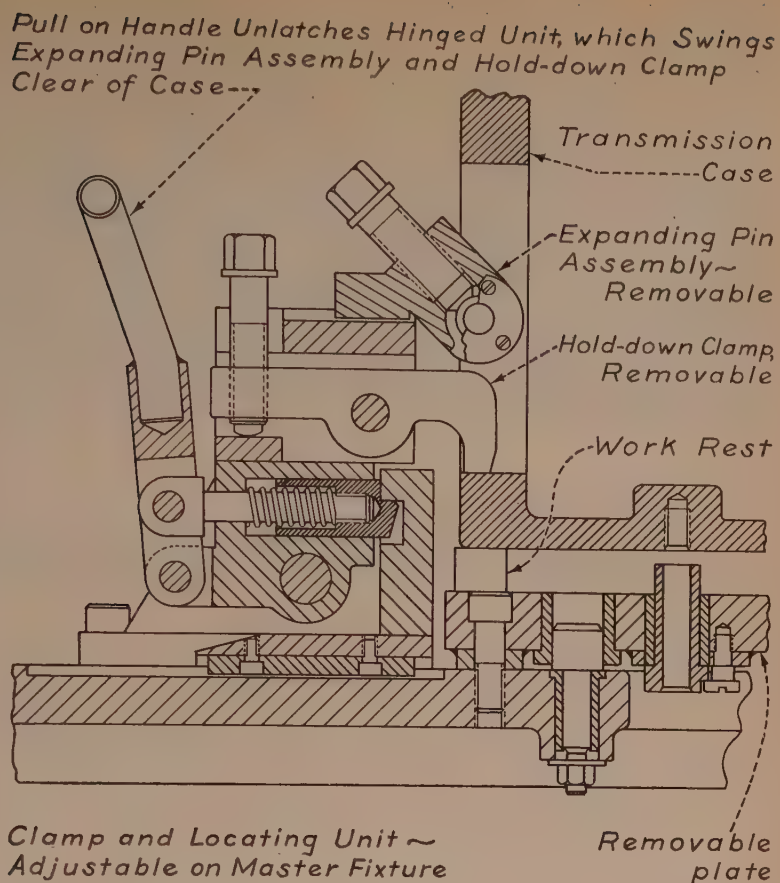
and chamfering tools, and all the locating plugs that fit into the mainshaft and countershaft bores of the case.

The transmission cases going into this fixture vary approximately 8 in. in overall length. All of this range is absorbed by the right and left hand screw arrangement of the master fixture. For tapping these holes, an almost identical fixture is used as shown in figs. 1 and 2. Instead of carrying drill bushings, the removable plates have jig bored clearance holes that, when used with one removable bushing, greatly facilitate the setting up of the tapping spindles.

Figs. 3, 4 and 5 show a setup for drilling and tapping the cover face of a transmission case. Two standard multiple-spindle drill presses and one standard multiple-spindle tapper are tied together with square bar rails, on top of which travels an air powered trunion-type fixture. After loading the part, the operator starts the fixture on its way by pulling a control lever either to the right or left, depending upon the direction of travel. This action automatically pulls a shot-bolt from the rail and also depresses an air start button, thus operating the air motor used for traversing. The fixture travels about 1 fps and stops automatically beneath the proper machining station. At this point, the shot-bolt enters the rail and, by doing so, closes a switch that is interlocked with the start button on the machine. While traversing, a second air motor operated by trip dogs mounted on the rail rotates the workpiece, thus turning it from the loading to the drilling position. After drilling and while traveling toward the tapper it again rotates through a 180° arc and then immediately reverses. This action efficiently dumps chips out of the drilled holes.

Transmission cases going on this fixture vary

FIG. 5—The clamp and locating unit on the traveling fixture are adjustable. By means of removable details, such as the hold down clamps, locating plugs, and work rests such as shown here, the master fixture can be used for various sized parts.



as much as 8 in. in length, 10 in. in height and weigh anywhere from 30 to 120 lb. At this time, the only finished surface is the cover face, on which the case rests during drilling and tapping. Although the case shown in fig. 3 is a fairly small one, the operations to be performed on it are typical of most transmissions.

The first machine drills two dowel holes, drills to half depth two mounting holes and spot drills all holes that are to be tap drilled later, thus producing the chamfer in the first operation. The second machine reams two dowel holes, drills through two mounting holes, and tap drills the remaining holes. Two-step sub-land drills are used, thus avoiding the necessity of changing any drill bushings while moving from one machine to the other. The third machine taps all holes other than the two dowel and the two mounting holes.

Prior to fixture designing, the tool engineering group gave considerable thought as to the type of tooling that would be best suited to meet production requirements and keep quality standards high. After examining fig. 3, it is evident that much thought was also spent to provide tooling that keeps to an absolute minimum idle machine time resulting from too much part handling, tool change-over, and fixture maintenance. Although illustrations show only drilling operation on the case, the trans-

mission case and cover lines are using many such master fixture applications where milling, drilling or precision boring operations must be performed. One special double-end machine equipped with an indexing type master fixture drills and precision bores clutch throw-out yokeshaft holes. This fixture, by means of master setting blocks, positions as many as 83 different bell housings to their correct location in reference to the drilling and boring spindles.

Interchangeable tooling has found a place in every manufacturing department in this plant. It is used when manufacturing axle units as well as when machining universal joint parts. Interchangeability of details is profitable in broaching fixtures as well as in tooling applied to vertical and horizontal multiple-spindle lathes. Since universal tooling is always originally planned around producing similar parts over one single fixture having replaceable details, little difficulty is encountered at a later time when fitting additional new parts into these fixtures becomes necessary. This, of course, substantially lowers tooling cost. Because of this, it is very often possible to keep the tool cost per unit of a small lot product at a comparative level with the tool cost per unit of a similar product produced at a continuous production rate.

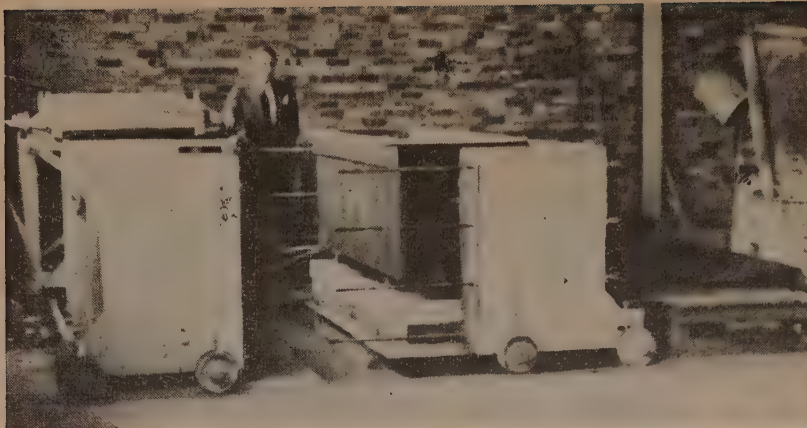


FIG. 1—Small size split furnace galvanizing bath with the furnace sections rolled apart. The galvanizing pot is sitting on the right half of the furnace.

Split Type Electric Furnace

By WALLACE G. IMHOFF

*President,
Wallace G. Imhoff Co.,
Los Angeles*

ELECTRIC galvanizing baths in which the kettle is left permanently on the hearth while the lighter part of the structure, the furnace itself, is designed for easy removal have simplified operations in a number of foreign galvanizing installations.

The furnaces are designed either to split and separate from the bath, figs. 1 and 2, or, for small units, may be in a ring shape which can simply be lifted from around the kettle. The installations have been designed by B. Allert, Melbourne, Australia, and are being manufactured by Major Electric Furnaces, Melbourne.

Eight such installations have been set up in sizes ranging from a ring type bath with a 280 lb per hr output to a large unit, fig. 3, having a 3 ton output per hr.

The prime advantage of the design is that the ease of furnace removal permits ready access to both heating elements and pot walls for inspection and repair. The ease with which routine inspection of the kettle walls can be carried out has proved worthwhile in preventing pot failure and subsequent damage to electrical equipment. Regular inspection will prevent most failures, for usually prior to a breakthrough portions of the walls are weakened so that the pressure of the molten zinc bulges the danger spots.

Inspection of the furnace chamber in a split type installation has been found to require only 5 to 6 min, including the opening of the unit by rolling the two split furnace halves apart. After inspection, about the same time interval is required to close the furnace for operation.

In one repair job, safety contacts inside the furnace chamber indicated a fault or bulge in

the pot of a split type furnace bath. The company could not allow a prolonged interruption in production so the locking bolts of the split furnace casings were removed and half the furnace was ratcheted aside. Since the repairman was in an updraft of cool air and could arrange asbestos board screening to eliminate radiated heat, it was possible to enter the space between the bath, with its molten zinc content, and the furnace walls. As soon as the weakened area was repaired, the furnace was swung back into position, the power switched on and the two furnace halves were again bolted together. The entire operation required $\frac{1}{2}$ hr during a lunch period and work was immediately resumed with no loss in production.

The electric furnaces are equipped with automatic devices which facilitate control and operations, and are economical in increasing the life of the pot. Temperature is governed by heater groups through recording potentiometers, and controls can be set so that temperature is dropped automatically during nonoperating hours and automatically brought back to dipping temperature at the scheduled time.

Thermocouples for the bath have been incorporated into the furnace units rather than projected into the bath, in order to save operating space.

With this type furnace, even and equal heat input on the walls of the bath has been possible, increasing pot life by elimination of hot spots and giving uniform work quality because of the closer control of bath temperature possible. Such control also avoids the formation of excessive dross and has improved working conditions.

Furnace design provides a greater heat input

FIG. 2—Large split type installation shown in the open position.



For Galvanizing Baths . . .

Accessibility to the galvanizing kettle for inspection and repair is of prime importance in electrically heated galvanizing baths. This article describes sectional and ring type furnaces, developed in Australia, which are especially designed to permit rapid and easy removal of the furnace from around the kettle. Other features of the units are close and automatic temperature control and distributed heat input for optimum efficiency.

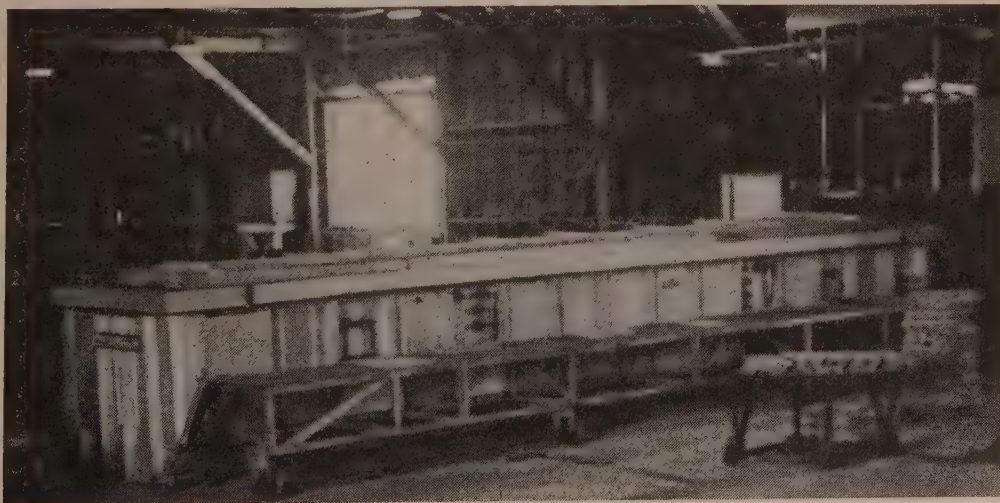
at the topmost portion of the bath to compensate for surface losses and the heat absorbed by dipping of the work. Minimum heat input is maintained at the lowest sections to allow dross to settle and keep the molten zinc free from pollution. Heat to the welded vertical edges of the bath is also somewhat reduced as these areas are usually less resistant to zinc attack than other sections.

The largest of the split type furnaces installed, fig. 3, in which the pot is 28 ft long, 3 ft wide, 4 ft deep and has a filled weight of 75 tons, is equipped with four independently movable furnace sections. A heavy top flange on the kettle provides support against the zinc pressure on the long walls—the design being such that thermal expansion differences compensate for mechanical

deflection of the flange. Radiant type, heavy nickel-chromium heating elements held in steatite supports are arranged on the inside walls of the furnace, and steel girders along the top of the furnace sections support the walls and provide a gangway for the operators. Since the bath is relatively long, temperature control is maintained by three independent longitudinal sections, each having three heater groups. Thermocouples of the surface type, constructed in such a way as to avoid influence from the heating chamber, are used to measure and control the outside temperature of the bath wall. Potentiometer recorders and controllers actuate all nine heater groups.

Patents pending in the U. S. on galvanizing baths of this design have Serial No. 650,777.

FIG. 3—Largest of the split type units thus far installed. The bath, shown with the furnace closed, has a 3 ton. per hr output.



... NEW BOOKS ...

"*Quality Control*," by N. L. Enrick. Inspection and quality control techniques are described in this book with specific examples from casting, press working, machining, assembly, plating, polishing and other processes. Control charts and the problem of setting specifications are also discussed. Industrial Press, 148 Lafayette St., New York 18. \$3.00. 122 p.

* * *

"*Elementary and Applied Welding*," by H. P. Rigsby and C. H. Groneman. Book, designed for the beginning student in oxyacetylene and arc welding, describes industrial welding methods, tools and equipment, metals, and safety practice. Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee 1. \$2.00. 151 p.

* * *

"*Centrifugal and Axial Flow Pumps*," by A. J. Stepanoff. Designed for engineers, consultants and plant designers in the pump industry, this manual covers pump theory, design and application. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. \$7.50. 428 p.

* * *

"*Process Engineering*," by W. H. Schutt. Estimating procedures are described in book to assist in determination of the selling price or direct labor cost of articles proposed for manufacture but still in the blueprint stage. Formulas, based on speeds and feeds of power

presses and other machines, are given for production in cost calculations. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. \$4.00. 309 p.

* * *

"*Designing for Alcoa Die Castings*." Book discusses applications in which aluminum and magnesium diecastings can be used to cut costs, and describes machines, dies and alloys for diecasting work. Chapters on design, machining, finishing, and inspection and testing are included. Aluminum Co. of America, Gulf Bldg., Pittsburgh. \$1.00. 188 p.

* * *

"*Labor-Management Cooperation for Increased Productivity*." Booklet contains four papers presented at the Winter Production Conference of the American Management Assn. Joint development of standards, plant-wide incentives, merit rating in job shops, and the human factor in production are subjects of the papers. American Management Assn., 330 W. 42nd St., New York 18. \$1.00. 48 p.

* * *

"*Design of Metal Cutting Tools*," by R. L. Woodcock. Fundamental principles of tool design are described and the application of these fundamentals to the design of hobs, broaches, cutters, punches, dies, counterbores and other cutting tools are given. Adaptation of jigs and fixtures to new products is also discussed. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. \$5.00. 350 p.

Personality Factors in Future Employee Selection

(CONTINUED FROM PAGE 109)

mately put it, "to get off their lead pants." At least, he held that view until he discussed the quarterly production summaries with his department head.

But if we accept the notion of the rapidly mounting importance of personality factors in selecting and promoting employees, the question of *how* such selection is to take place still remains unanswered. Every factory official has heard some of the extravagant claims made for aptitude and personality tests which were supposedly the answer to all employment problems. Some have even instituted such testing programs only later to experience bitter disappointment at the insignificance of the results and the extravagance of the costs. Others, it should be emphasized, have found reliably administered selection programs wholly satisfactory. The point here is that there are quacks as well as respectable persons in every field, and industrial psychology is no exception. Anyone in doubt about the validity of any proposed selection program can talk to the clinical or industrial psychologist at the nearest university.

Not a great deal has been done thus far in examining the role of personality and job success. In Chicago, Burleigh B. Gardner has established a successful selection program for executives which scrutinizes certain personality

variables. An insurance company has worked out the personality requisites which make for success in selling insurance. But as far as factory jobs are concerned, relatively little has been accomplished in specifically relating personality traits to job success. A good deal has been done with the study of the mechanical aptitude necessary for efficiency on such jobs, but virtually no time has been spent on personality as related to shop worker efficiency. If an attempt were made to include all jobs, it would be rather expensive to establish such personality evaluation programs at the present time. However, a practical way to initiate a selection program of this sort would be to take one or two jobs in a given plant and subject them to a careful analysis of the personality characteristics that made for job stability and efficiency. Then tests which are already in existence would be interpreted by specially trained persons, and those workers who were most likely to succeed would be picked out from the applicants.

It seems fairly definite that personality traits of the worker will increase in importance as the current trend toward greater job security advances. Future job specifications will place just as much emphasis upon the factors of personality as upon the factors of aptitude and skill.

New Production Ideas

Equipment and methods featured this week include: A lapping machine, a hydraulic turret press, a diecasting machine with four interchangeable unit dies, jet blast cleaning, castings impregnation, a three-phase mash welder, gear and piston pin checkers, a deburring barrel and separator, a magnetic roll conveyor for pipe, and preforming forging blanks by rolling.

Lapping Machine

PRECISION lapping under severe production schedules is claimed for a new machine applicable to production runs or individual jobs that can be operated by unskilled workmen. Known as the Lapmaster, it embodies a continuously agitated compound tank, an alloying iron lapping plate driven by a gear reduction motor, and combined work holders and wear rings that are held in place by adjustable bars.

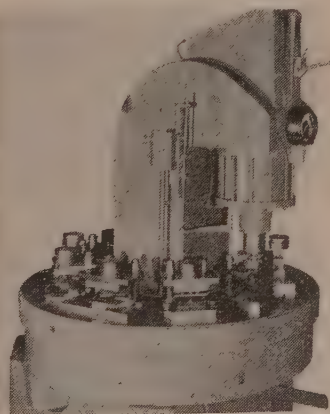


Lapping cycle time is automatically controlled by a clock, which stops the lapping plate and closes the compound valve at the end of a predetermined period. Continuous self-conditioning of the lapping plate is said to afford controlled and continuous accuracy in flat, concave, and convex lapping up to .00016 in. or less than one light and per in. of surface. Lap rollers under the work, as do wear rings. The work in turn, is free to rotate on its own axis in the work holders to generate uniform grinding action. Model 12 is equipped with a 12-in. lapping plate and three wear rings, each with internal capacity of $4\frac{1}{4}$ in. It is

one of seven models which will be available with lapping plates of 12, 18, 24, 36, 42, 48, or 72 in. The 41-in. Lapmaster has a setup of four wear rings and work holders and is equipped with hydraulic cylinders for lifting the wear rings. *Crane Packing Co. For more information, check No. 1 on the attached postcard.*

Hydraulic Turret Press

A NEW hydraulic turret press, that practically eliminates tear down and setup time, is especially adaptable on short runs where a schedule per day, week, or month is required. The press has a large turret table that will accommodate as many setups as will fill the table. After initial mounting of fixtures the operator in a minute's time can change from one fixture to another whether the operation is blanking, forming, drawing, swedging, or as-

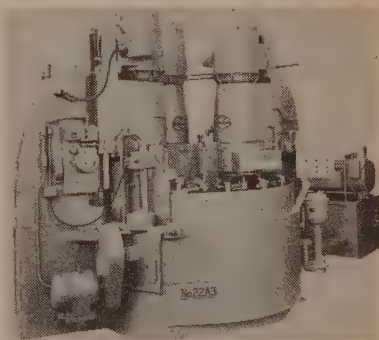


sembly. The presses are built in 10, 20, and 30-ton sizes and may be operated automatically or manually. The press, frame and turret table are fabricated steel. Equipment includes easy-to-read load gage, electric limit control, electric overload control, magnetic power

valve, and magnetic push button starter. The turret table is 48 in. OD and 20 in. ID. Maximum ram stroke is $4\frac{1}{8}$ in. *Universal Air-Line-Joint Mfg. Co. For more information, check No. 2 on the attached postcard.*

Automatic Surface Grinder

A NEW automatic surface grinder has been built with three wheels 22 x 4 x 16 in., and a work table of 68 in. OD, 40 in. ID. The work to be ground may be any size that will lie between the

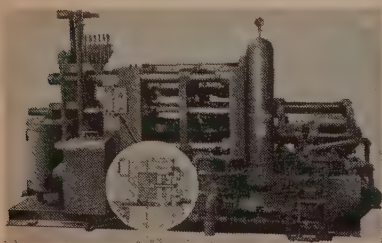


inner and outer edges of the circular table. The standard height for work is 12 in. With two wheels roughing and one wheel finishing, this machine is capable of removing any amount of stock that is usually allowed on castings within its capacity. The three heads and columns, with feed mechanisms and size control calipers, are identical. The machine may operate with two wheels roughing and one finishing, with one wheel roughing and two finishing, or all three wheels can take heavy cuts. The continuously rotating table carries the work in succession under the roughing and finishing wheels, each wheel reducing the work height to that determined by the setting of the caliper

for that wheel. Final size is held within ± 0.0005 in. *Blanchard Machine Co. For more information, check No. 3 on the attached postcard.*

Diecasting Machine

ARRANGEMENT of machine plates whereby the fixed plate and traveling plate are adapted to directly receive die inserts in their abutting faces, is one of several features incorporated on the new Unit Die machine. In this ar-



range, four unit dies, each of which is a complete die, become an integral part of the machine plates. Each of the four unit dies may be changed and others substituted as production requires. This is said to give almost continuous production with essential flexibility of schedule for individual castings. Interchangeability of unit dies is claimed to permit production of four different parts at one time. Machine plates, both fixed and traveling units, are recessed to hold respective halves of the die. Operating machine plates are designed to assure alignment without conventional guide pins and bushings. *B & T Engineering & Sales Co. For more information, check No. 4 on the attached postcard.*

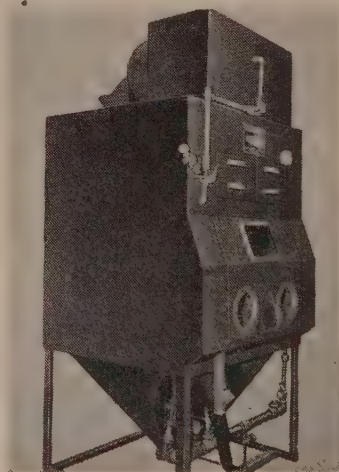
Distribution Transformers

TWO types each of single-phase and three-phase dry-type distribution transformers provide specific voltages where required for auxiliary lighting and power circuits. Two-winding dry-type transformers are built as single-phase type AE, in sizes 250 va to 200 kva, and as three-phase type AP, in sizes 3 to 300 kva, in the 600 v class and below. Dry type auto transformers are built as single-phase type AA, in sizes 500 va to 25 kva, and as three-phase type AM, in sizes 5 to 50 kva, both types 240 to 240/120 v.

All have class A insulation and the rated 55°C rise continuous duty. Single-phase, two-winding units through 10 kva, and single-phase auto transformers through 25 kva are suitable for either indoor or outdoor installation. Larger three-phase units, and single-phase two winding units are designed for floor or platform mounting, and are suitable for indoor service only. *Wagner Electric Corp. For more information, check No. 5 on the attached postcard.*

Blast Cleaning Machine

WET abrasive blast cleaning and finishing of metal surfaces with a new jet blast machine removes rust, scale and undesirable metal particles by projecting a slurry of fine abrasive suspended in water against the surface to be cleaned. The variation of 60 to 1250 mesh in abrasive size makes it possible to produce finishes as low as 2 to 3 microinches rms. The method produces a matte finish with practically no removal of metal. Specifications of standard models are: 30 x 30-in. cabinet, 77



in. high, one blast nozzle and exhaust blower direct connected to $\frac{1}{4}$ -hp motor; and 48 x 42-in. cabinet, 108 in. high, one to eight nozzles and exhaust blows direct connected to 1-hp motor. *Armstrong Chemical & Machine Co. For more information, check No. 6 on the attached postcard.*

Castings Impregnation

EELIMINATING porosity in pressure castings is claimed possible with the new Model 30 Mogullizer, a combination vacuum and pres-

sure unit recently developed. The machine is a high efficiency circulator for use with a special metallizing impregnating solution known as Mogul Cast Seal Type B. Fast impregnation of castings can be accomplished on a volume basis, and all types of castings ranging from small bronze steam valves to large cast iron freon engine heads, carburetors, pressure castings of aluminum, bronze, stainless steel, and cast steel can be successfully impregnated. The new machine consists of a vacuum pump, sealing



tank, supply tank and agitator, heating elements, high pressure air connector, rinsing tank, and city water supply and drain connections. *Metallizing Co. of America. For more information, check No. 7 on the attached postcard.*

Three-Phase Mash Welder

A NEW three-phase welding machine is rated at 200 kva with a throat depth of 52 in. and is capable of mash welding two thicknesses of 0.019-in. clean mild steel. It is equipped with an automatic hydraulically operated locating fixture for determining the metal overlap of the seam for correct mash welding performance. Four hydraulic cylinders provide high clamping pressure to the clamping bars. The machine is fully electronic with squeeze, heat, cool and off time. The arrangement of the upper secondary current carrying bus bars permits direct welding with improved weld quality. *Sciack Bros., Inc. For more information, check No. 8 on the attached postcard.*

Ac Arc Welders

NEW ac arc welders feature built-in power factor corrector; finger tip, stepless current control; fan-forced ventilation; wide current range; and moderate open circuit voltage operation. Units ar

the transformer type, available 150, 200, 300, 400, 500 amp capacities. They provide instant plug-plug-out electrode leads by per-type connectors. Running



is available where portability required. *Metal & Thermit Corp.* For more information, check No. 9 on the postcard.

Gear Tester

TO facilitate the accurate checking of spur gears and worm gears, an improved model Parkson gear checker incorporates improvements to save time in setup without need of making special fixtures



bushings in changing over from job to another in checking gears from 4 to 24 or 36-in. center distance. In a typical worm gear set, the worm, integral with the shaft, rests in two V brackets, the worm shaft having two different diameters on both ends. This ordinarily involves making two bushings. The V bracket is said to solve the problem, since one of the brackets is adjustable in height by

screw and handwheel to compensate for different shaft diameters. In cases where the mounting of the worm in bushings is desirable, the V blocks, may be replaced with a pair of cylindrical bushings or centers for holding the work between centers. One of the centers is adjustable for quick changing of work. When checking spur helical or herringbone gears, the worm-slide is removed, freeing the taper bore in the floating slide. *George Scherr Co., Inc.* For more information, check No. 10 on the attached postcard.

Gear Shaper

USING no coolant, a new Shear-Speed gear shaper cuts simultaneously in 33 sec, all teeth of a cast iron transmission clutch gear of 4-in. diam, 51-tooth, 1½ in. face width. The tools are sharpened after each run of 1600 gears. They have a negative rake of 3° and are designed so that four different gears can be cut on the machine with the same tooling. Output of this single spindle gear cutting machine is rated at 550 gears per 8-hr shift, including down-time for tool sharpening. *Michigan Tool Co.* For more information, check No. 11 on the attached postcard.

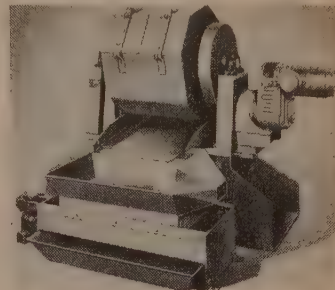
Lathe Spindle Nose

A STANDARD taper-key drive spindle nose is now furnished in place of the threaded type on all LeBlond Regal lathes to permit tapered chucks and face plates to be interchanged among Regals, heavy duty types and other types of lathes. This feature will be standard equipment on this line, including bench, floor, gap and roll grinding models. Advantages include easier and faster chuck and face plate mountings, safety mounting for chucks and face plates that are locked on, and increased accuracy through reduction of bearing surface wear. *R. K. LeBlond Machine Tool Co.* For more information, check No. 12 on the attached postcard.

Deburring Barrel-Separator

DEVELOPMENT of a combination deburring barrel and separator that saves time, labor and floor space has been announced. In the barrel, burrs are removed

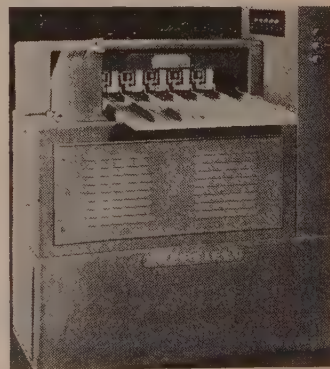
from machined parts without affecting close tolerances, and a uniform finish is produced for painting, many types of electroplating, and burnishing. The barrel has two compartments permitting two



independent jobs to be run simultaneously. Rotation of the barrel is by variable speed drive, adjustable to any rotating speed between 13 and 39 rpm by hand crank. As the barrel is emptied, the load slides down the chute into the separator that separates the work and media. A hopper, which tilts for emptying, and a removable drawer below provide easy handling of the separated media and work. *Belke Mfg. Co.* For more information, check No. 13 on the attached postcard.

Piston Pin Checking

PISTON pins are checked for average diameter and automatically segregated into six classifications at approximately 2400 pins



per hr by a recently developed machine. Pins are manually loaded into a chute which has a No-Go gaging fixture to prevent oversize parts from being accepted. The remaining parts are gravity fed into a locating V where a motor driven arm progresses a part into an air ring. After it comes to rest, it is checked by jets mounted in the ring that operate Sheffield Air-electric heads. These in turn actu-

ate solenoids that open and close trap doors to the segregating chutes. The pin is then pushed through the air ring by the next piston pin to be checked and is carried along by the traveling mechanism until it reaches its proper trap. *Sheffield Corp. For more information, check No. 14 on the attached postcard.*

Magnetic Pipe Roll Conveyor

INCREASED production of galvanizing pipe is claimed for a recently developed magnetic pipe roll conveyor. The machine consists of a series of concave magnetic rolls electrically energized, built



into the steel frame structure, with anti-friction bearings and unit motor drive. In the operation for galvanizing and conveying pipe with these rollers, the operator raises a length of pipe from the kettle and contacts the first magnetic roll, which propels it through a steam blowing ring to remove the excess spelter. The pipe then contacts the second magnetic roll and is carried forward. As the pipe travels upward and reaches the last concave roll, it hits a trip which de-energizes one or two rolls that support the pipe, and the pipe falls upon the cooling table. The unit can be supplied with or without variable speed drive, supports, and energizing equipment. *Magnetic Engineering & Mfg. Co. For more information, check No. 15 on the attached postcard.*

Tube Cutter

FEATURING free wheeling ball bearing action, a new tube cutter has been designed for cutting copper, brass, aluminum, Bundy steel, block tin and lead tubing, hard or soft temper, and will cut all sizes from 1/8 to 1 in. OD. Ball thrust bearings are built into the tool to provide extreme ease of operation and to make possible speedy size adjustment. One feature is a retractable locking reamer for reaming tubing after it is cut. The body of the tool which is 4 1/2 in. long, is high strength aluminum

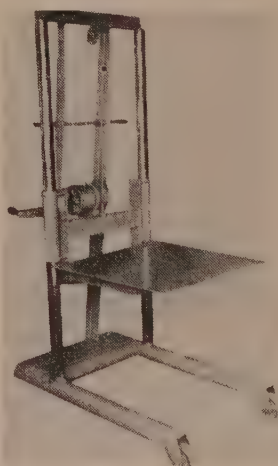
alloy. *Imperial Brass Mfg Co. For more information, check No. 16 on the attached postcard.*

Hard Facing Electrodes

TWO new tubular type shielded-arc electrodes Faceweld No. 1 and No. 12, are said to provide a high consistency to the deposited alloy, at low cost. Faceweld No. 1 deposits a chromium carbide type alloy surface and is used for hard facing parts of plain carbon, low alloy, or manganese steel. Faceweld No. 12 is of the same type but designed for use where the hard faced surface must withstand extremely severe abrasion as well as some impact. Both maintain high abrasion and hardness values at red heat. Their corrosion resistance is comparable generally to that of stainless steel. They operate on either ac or dc and are available in 14-in. lengths in 5/16 and 3/16 in. diam. *Lincoln Electric Co. For more information, check No. 17 on the attached postcard.*

Portable Elevator

ALIGHT duty, portable elevator is available in all capacities for both hand and electric operation and with various size platforms and heights. Type C, illustrated, has a capacity of 750 lb,



and a platform 24x24 in. The unit is 69 in. high, 25 in. wide and 39 in. long. The elevator features an easily operated floor lock, a self-locking safety type winch, and a three-speed lever adjustable for light, medium and heavy loads. Gears operate in grease bath. *Montgomery & Co., Inc. For more information, check No. 18 on the postcard.*

Reduceroll

UNIFORM blanks free of shuts and folds can be pre-formed in quantity with the Reduceroll, a new machine that reduces forging blanks by rolling, accurately distributing the stock to meet the requirements of the final forging. The machine eliminates fullering and edging operations necessary to prepare blanks prior to impression die forging in a hammer. The Reduceroll is equipped with an air controlled friction clutch, tripped



for each pass by a foot pedal. The circular rolls are overhung to permit easy feeding, accessibility, and quick change. This machine has a rigid steel frame, and the motor geared to the flywheel, is enclosed in the base. Five sizes are built. *National Machinery Co. For more information, check No. 19 on the attached postcard.*

All-Weather Cab

AWEATHER-TIGHT cab for driver protection can be obtained for installation on the Yardlift-40 and Yardlift-60 models of Clark Equipment Co.'s pneumatic tired fork truck series. The cab is constructed of heavy-gage sheet steel for durability; ample windows provide side and forward vision. The roof window, of glare-proof plastic, provides ample visibility for high tiering. *Clark Equipment Co. For more information, check No. 20 on the attached postcard.*

Rotary Valve

ANEW rotary type valve provides maximum efficiency of hydraulic controls for Reeves variable speed transmission. The new valve permits automatic speed regulation for synchronization of

ferent machines and separate sections of a single machine; maintenance of control tension and uniform peripheral winding speeds; and maintenance of uniform pressure, weight, liquid level, temperature and other variable elements. Simple in design and with few moving parts to wear, the valve is actuated with 4-oz pressure. Only two sets of valves are required to fit Reeves transmissions using hydraulic controls. *Reeves Pulley Co. For more information, check No. 21 on the attached postcard.*

Explosion-Proof Motor

TOTALLY enclosed fan-cooled motors in the No. 736 frame size, are being built in ratings of 10 hp at speeds of 3500, 1750, 1160 and 870 rpm, 550 v or less, and 150 hp at the same speeds for operation at 2300 v. These motors are approved by the Underwriter's laboratories for Class I Group D and Class II Groups E, F, and G hazardous locations. They feature cast aluminum rotor with heavy-duty ball bearings, one-piece cast iron frame, and an externally mounted fan. *Wagner Electric Corp. For more information, check No. 22 on the attached postcard.*

Steel Work Bench

HEAVY-DUTY steel work bench is made with 11-gage prime steel top and 13-gage prime steel channel type legs, measures 48 in. high, 28 in. wide and 72 in. long, and weighs 150 lb. For added strength it is reinforced with cross members. *Tri-State Metal Products, Inc. For more information, check No. 23 on the attached postcard.*

Reversing Contactor

CONTROL of small ac and dc motors used in connection with small hoists, overhead doors, trolley cranes, mechanical speed changers, and other intermittent duty applications, is possible with new compact reversing contactor. The contactor consists of double magnet frames and contact blocks with two three-pole armature assemblies mounted on one base and mechanically interlocked. The device has straight line vertical action, and double break, silver-to-silver contacts eliminate flexible leads, low contact resistance, and do not require cleaning or dressing. The contactors are suitable for use

with ac polyphase motors rated up to 1 hp and with ac single phase and dc motors rated up to 3.4 hp. *Industrial Controller Div., Square D Co. For more information, check No. 24 on the attached postcard.*

Case-Hardening Paste

A PASTE that does a case-hardening job without special equipment, and does it faster than conventional methods, has been developed. A major advantage of this paste, which is called Carburit, is its ready use for selective hardening. The section to be hardened is covered with Carburit and heated to about 1700°F. A case 0.010 in. thick will form in 5 to 7 min and only 25 to 30 min are required for a 0.040-in. case. After heating with Carburit in place, the work is cooled and reheated to 1500°F. Then the paste is knocked off and the work is quenched. The paste can be applied to only part of the work or

to the entire surface. Any source of heat can be used with Carburit. *Denfis Chemical Laboratories, Inc. For more information, check No. 25 on the attached postcard.*

Air Line Lubricator

A NEW automatic lubricator for use on lines serving compressed air operated tools and equipment, meters the oil into the air stream as a fine mist, reducing friction and heat and thereby prolonging the life of air powered equipment. The lubricator consists of a body to which pipe connections are made and a transparent plastic bowl containing lubricating oil. The rate of flow of oil is visible and can be controlled by a needle valve. Units are available in $\frac{3}{8}$ and $\frac{1}{2}$ in. sizes built of non-corrosive materials for line pressures to 150 psi. *Hannifin Corp. For more information, check No. 26 on the attached postcard.*

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Sales Charts

BOOKLET gives information on methods for increasing sales effectiveness. Charts which show account gains and losses without requiring clerical calculations are described and the value of the system in spotting incipient sales weaknesses is discussed. *Remington-Rand, Inc.* For more information, check No. 27 on the attached postcard.

Fork Lift Trucks

APPPLICATIONS of fork lift trucks in a variety of industrial materials handling problems are described in bulletin. The use of an unloader accessory to cut handling time is also discussed. *Towmotor Corp.* For further information, check No. 28 on the attached postcard.

Steel Tubing

INFORMATION on seamless and welded carbon steel tubing, stainless tubing and pipe, structural tubing, and seamless and welded boiler tubes is given in 32-page catalog. Machining, heat treatment and fabrication of the tubing is discussed. *Joseph T. Ryerson & Son, Inc.* For more information, check No. 29 on the attached postcard.

Press Welders

BULLETIN 3-123 gives information on motor-driven press welders having speed ranges from 49 to 148 spots per min. Maximum welding force is 1175 lb. Welders operate on single phase, ac, 220, 440 or 550 v; 50 or 60 cycles. *Taylor-Winfield Corp.* For more information, check No. 30 on the attached postcard.

Crank Shapers

CATALOG gives information on a line of crank shapers. Each feature of the units—tool head, ram, crossrail, column, base, transmission, gear assembly, rocket arm, lubrication system, table control, etc.—is dealt with. *General Engineering & Mfg. Co.* For more information, check No. 31 on the attached postcard.

Variable Speed Motors

BULLETIN describes variable speed motors, which permit the operator to obtain an infinite number of speeds, and discusses applications in which the motors have saved manhours and resulted in better production. *U. S. Electrical Motors, Inc.* For more information, check No. 32 on the attached postcard.

Straight-Side Presses

BOOKLET gives information on 1,2 and 4-point straight-side presses. Capacities range from 100 to 2000 tons. Presses feature internally ribbed frames, full eccentric, single, double or triple gearing and disk type clutches. *Danly Machine Specialties, Inc.* For more information, check No. 33 on the attached postcard.

Bulldozer-Shovel

BULLETIN discusses a shovel which can be quickly converted into a bulldozer. The unit has been designed for attachment to tractors. Second bulletin describes a loader also designed for tractor attachment. *Frank G. Hough Co.* For more information, check No. 34 on the attached postcard.

Motors

MOTORS of 1 hp or larger for driving power house auxiliaries are described in bulletin. Data on types and characteristics of induction motors, and construction details of open type motors and enclosed fan-cooled motors are given. *Allis-Chalmers Mfg. Co.* For more information, check No. 35 on the attached postcard.

Interfloor Conveyor

ESCALATOR-TYPE, interfloor, power belt conveyer is described in bulletin. Details of the frame, supports, motors, belts, speeds and capacities for both horizontal and inclined models are given. *Rapids-Standard Co., Inc.* For more information, check No. 36 on attached postcard.

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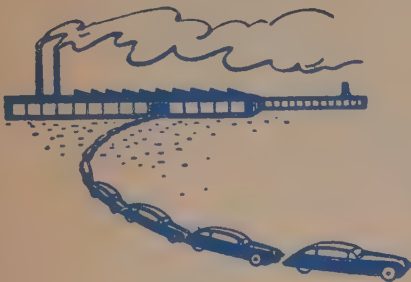


DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

Representatives in Principal Cities

• Business as usual is auto industry's reaction to Democratic victory at the polls . . . Greatest concern over materials controls... Davis shows three-wheel car.



DETROIT—The catch line employed by a local columnist to describe Detroit's reaction to the Truman victory in the recent election was, "In God We Trust." This is hardly typical.

The automobile industry expects to continue its business of making and selling automobiles without interruption or serious interference under Truman's new administration. Its No. 1 problem is still steel—not Truman.

Most auto executives feel the new Truman Administration will lean strongly to the left. They expect a determined effort will be made to increase excess profits taxes. Rather than outright repeal of the Taft-Hartley Act, it is predicted that the present law will be modified. Abolition or modification of the closed shop provisions of the national labor law are anticipated by most sources. Present restrictions on picketing may be lifted it is felt by a Congress that will undoubtedly be dominated—in the beginning at least—by the little man from Missouri who surprised practically everybody in the

nation by his sweeping upset victory at the polls.

The automobile industry's greatest concern at the moment appears to be what Mr. Truman will do about materials controls. The industry is unalterably opposed to controls on any commodity. It has said so at every opportunity. Most Detroit executives feel Mr. Truman will run into sizeable opposition from both the Republican and the conservative members of his own party if he attempts to reimpose controls on materials. They doubt that a program calling for drastic material controls can be pushed through Congress, at least without a terrific fight.

At the same time, Detroit is not overlooking the fact that the fear of controls could touch off another inflationary wave that might eventually lead to the actual imposition of tough government regulations on materials. At the moment this seems to be a source of greater concern than the immediate possibility of government allocations to replace the present voluntary allocations. Incidentally, these are already a source of considerable anxiety to the motor industry.

The labor problem is something else again. Labor is expected to take full credit unto itself for getting out the right vote at the recent election. (Walter Reuther has lost no time in calling the election a "mandate" for labor.) Credit can hardly be denied under the circumstances and it is expected that labor interests here will be loud and vocal in claiming the lion's share of the Truman victory.

In addition, the stunning defeat of Governor Sigler at the polls by a Democratic candidate pledged to repeal the state's little Taft-Hartley Act, the Bonine-Tripp law, is going to add another string to labor's bow in Detroit. This will be true despite the fact that Truman was unable to carry Michigan.

Some elements here expect a renewal of labor warfare. Even stronger attacks on management are anticipated in a labor press that appears more and more, as

some see it, to be doing the bulk of the laboring man's thinking in the automobile industry.

IT can be pointed out, however, that Democratic Governor-elect Williams, faced by a Republican house and Senate, is going to have tough opposition. It is also remembered here that even with an allegedly friendly state legislature and a Republican majority in his cabinet Governor Sigler had, at times, more opposition than he could master. Both the legislature and the cabinet of Governor-elect "Soapy" Williams will be Republican.

Whether rightly or wrongly, the automobile industry has always pictured itself as getting along in spite of rather than because of Washington. While few auto executives would permit themselves to be quoted on the election results, it may be significant that a Chrysler spokesman was willing to talk about the Truman victory. In a prepared statement, K. T. Keller, president of Chrysler, said, "There is no reason why we should not go forward making our country strong, prosperous and secure under the leadership the people have shown they want." The Chrysler Corp. has always been identified with the most outspoken anti-New Deal factions in the industry.

Detroit's respect for Mr. Truman's fighting qualities have undoubtedly taken a big boost as a result of his courageous campaign and sweeping victory. At the same time, he seems to many Detroit executives as a man of expediency and one who won't stay put very long. One day, as they see him, he's for something; the next day he's opposed to the idea he stood for yesterday. The auto industry expects to be completely baffled by many of the moves he will make during the next 4 years—or attempt to make. Detroit will often wonder where his advice comes from. Auto executives will continue to question his judgment—and even his motives.

At the same time, Detroit is glad the election is over. It has cleared

new Bullard type "K" economies widen scope of MULT-AU-MATIC method

Higher Speeds Meet New Job Requirements. Designed to lower production costs of small and medium sized jobs in cast iron, steel and light metal alloys, the new BULLARD Type "K" Mult-Au-Matic provides a wide range of spindle speeds up to 900 rpm to get full productive capacity out of modern cutting tools.

Saves Time Between Cuts. A newly developed index control mechanism permits faster return and advance of tool carrying heads and faster carrier index.

Higher Degree of Accuracy. New method of carrier index registry maintains repetitive accuracy from station to station, producing work to extremely close tolerances.

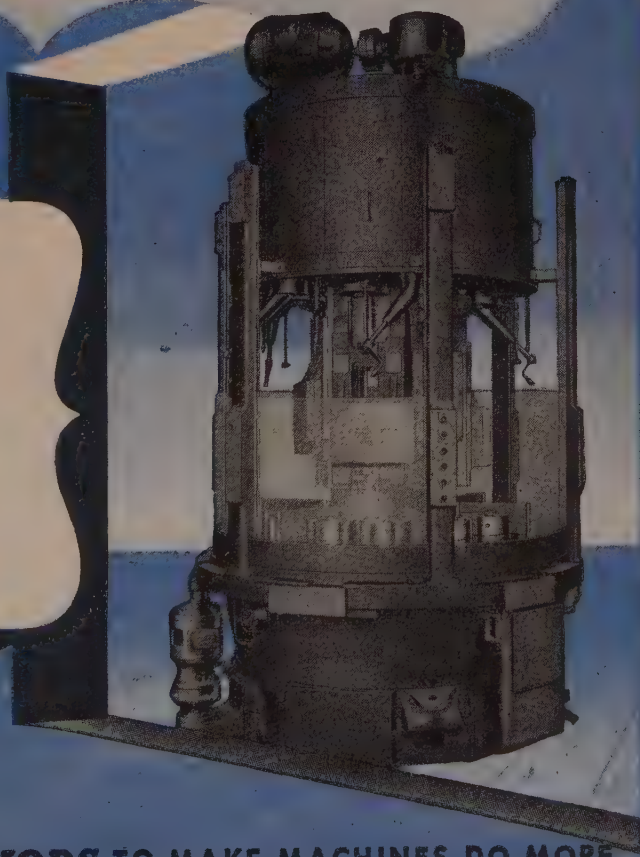
Improved Hydraulic Chucking Increases Efficiency. Work is chucked quickly by foot treadle control and automatically released as spindles return to loading station. Chucking pressure is adjustable to suit work characteristics.

Twin Spindles Double Production. Two of the four Type "K" models have twin spindles that deliver two finished pieces for every index cycle . . . a promise of lower production cost that is worth investigating further.

Write for complete information about the new Type "K" version of the Mult-Au-Matic method, one of the leading contributors to our modern American production system. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD Type "K" Mult-Au-Matics for work up to 10" in diameter come in four models: 6 or 12 spindles with speeds from 100 to 900 rpm, and 8 or 16 spindles with speeds from 98 to 880 rpm. 41 speed changes, 82 rates of feed, selective feeds and common speeds at all stations.

BULLARD



BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

the atmosphere. The auto industry now feels it knows better than it did a week ago what its problems are. It also has a good idea of the form the government programs are likely to assume. As one auto producer put it, "At least we know what we're up against. And we haven't done too badly about taking care of ourselves in the past."

DETROIT got its first look this week at the three-wheeled automobile being built by Davis Motor Car Co., Van Nuys, Calif. The Davis car, on display here for several days, was examined in detail, by members of the American Society of Body Engineers who are currently meeting at the Rackham Educational Memorial. The new car is torpedo-shaped and weighs only 1385 lb. It is priced at \$995 f.o.b. Los Angeles.

Davis engineers have borrowed liberally from aircraft design. The body stampings are aluminum and the car has a removable hardtop. The single seat is 64 in. wide.

According to Davis, the car is capable of speeds up to 100 miles per hr. Its designers are claiming 35 to 50 miles per gal of gasoline. The car has no fenders and a very low center of gravity. Off-the-

highway-use would undoubtedly be limited.

Wheelbase of the new Davis is 108 in. Overall length from bumper to bumper is 15½ ft.

The car is powered by a four-cylinder Continental engine. The one-piece windshield is curved. The instrument panel carries a tachometer as well as the usual instruments.

According to Davis, the Van Nuys plant is tooling up for vol-

ume production which is expected to start early in 1949. Up to the present time 23 pilot models have been built.

The company has not disclosed its plans for obtaining steel for the new cars which will be turned out at the rate of 50 units per day. However, the liberal use of aluminum should minimize its steel requirements. It is expected here that the initial bid of the company will be to potential second-car-in-the-family owners.

Metallurgists Honored

Detroit

• • • Metallurgists were pleased with the recognition given them at the recent ASM convention in which awards were made for distinguished service in the alloy steel industry. Included in the list were ten Detroiters who have been prominently identified with the development and utilization of alloy steel by the automotive industry. The Detroiters receiving distinguished service awards include: A. L. Boegehold, General Motors Corp.; C. N. Dawe, formerly associated with Vanadium Corp., Detroit; Walter E. Jominy, Chrysler

Corp.; F. E. McCleary, formerly of Chrysler Corp.; Harry W. McQuaid, formerly associated with Timken-Detroit Axle Co.; Robert B. Schenck, Buick Motor Div. General Motors Corp.; John F. Wanderingsee, formerly of Ford Motor Co.; J. M. Watson, formerly with Hupp Corp.; Albert E. White, University of Michigan, and William P. Woodside, Park Chemical Co.

In addition to the Detroiters on the list, several recipients of the awards have been very closely identified with the automobile industry through the years. These include: Hyman Bornstein, Deere & Co.; H. T. Chandler, Vanadium Corp.; Herbert J. French, International Nickel Co.; Frank P. Gilligan; Frederick J. Griffiths, Akron, Ohio; Walter G. Hildorf, Timken Roller Bearing Co.; Harry B. Knowlton, International Harvester Co.; Earl C. Smith, Republic Steel Corp.; and J. B. Johnson, Wright Field.

MINIATURE ASSEMBLY LINE: Hudson Motor Car Co. is building exact replicas in plastic of its new cars which are being sold to Hudson dealers. The models are 13 in. long and finished on one side in 2-tone color. The other side is transparent which enables the salesman to show construction details. Dies for these models are said to have cost \$35,000.



Truck Registrations Up

Detroit

• • • More than 800,000 new trucks will be registered during the first three quarters of 1948, according to R. L. Polk & Co., Detroit, statisticians. This compares with 650,000 truck units registered during the first nine months of 1947.

About a year ago leading automotive officials had predicted that new truck registrations would probably decrease during 1948 as compared with 1947.

Polk estimated September new passenger car registrations will total 314,000 units. Estimated new truck registrations are expected to reach 94,000, the agency said.

Die Casting by AUTO-LITE

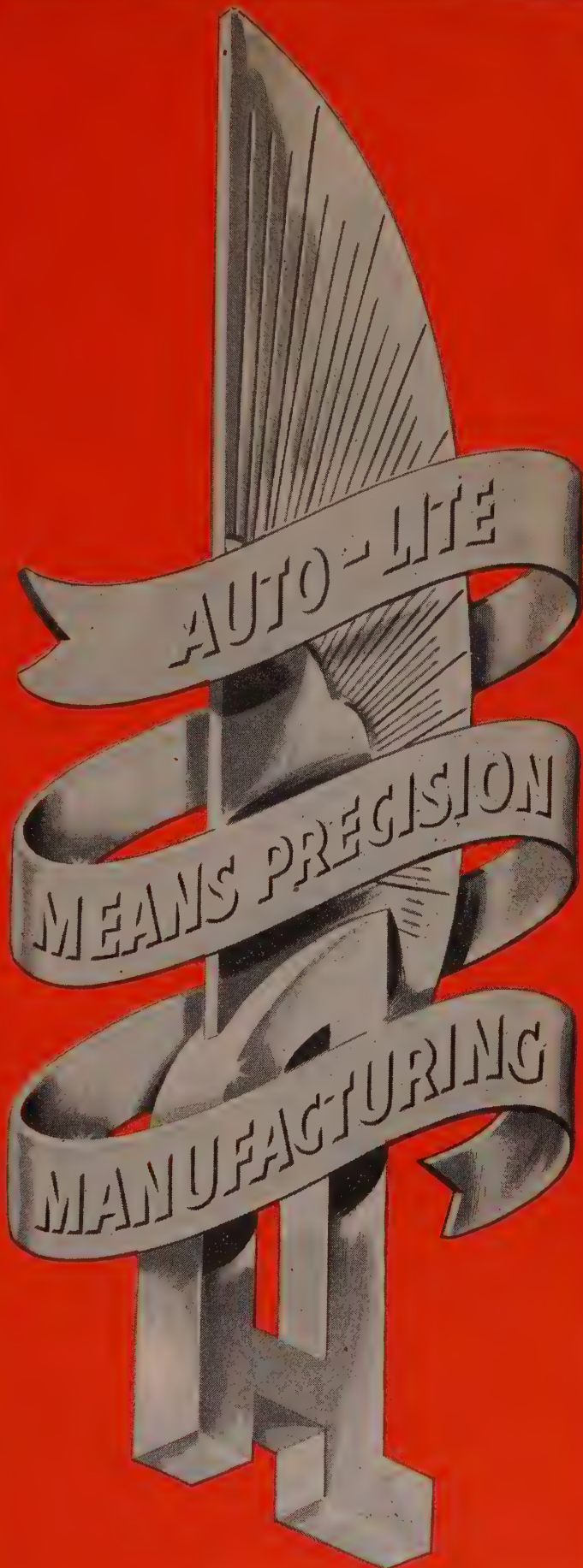
Manufacturers of a wide variety of products are benefitting from Auto-Lite die cast research and experience. Solid engineering, advanced casting methods, proper alloying practices and improved quality through "controlled metals" have made Auto-Lite a logical source of precision die castings.

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See in "Suspense!" the Auto-Lite Radio Show
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DIE CASTING, MACHINING, FINISHING AND PLATING OF ZINC AND ALUMINUM DIE CAST PARTS

• Overall construction rate still on increase but business building is leveling off . . . Public works requirements placed at \$5 billion annually . . . Large projects are already mapped.



WASHINGTON—In the midst of the general upswing in new construction activity, building for industrial and commercial purposes shows signs of leveling off. In these combined fields, construction of new facilities is riding along at little better than 1947 levels.

As a result of the continued summer upswing in building, there can be little doubt that 1948 will set a new mark in dollar volume. Estimates made earlier in the year now seem to have been well justified when a figure of \$18 billion or more was forecast.

Only part of this unprecedented volume is due to continued zooming costs. Measured on a dollar basis, the rate of increase over last year amounts to about 35 pct; if figured on the basis of work actually started or put into place, the rate is still 15 to 20 pct over 1947.

Somehow, industry has managed to make available sufficient iron, steel and related products to enable continued increase in production of construction materials. In one or two regions such as New England, construction volume has nearly doubled over last year. In only the

South Atlantic and East South Central areas has building fallen back—and that averages only 5 pct under the 1947 rate.

From here, however, it seems a reasonable guess that the \$18 billion figure for this year may stand as a high water mark—for a while at least. The tip-off is seen in two fields—the recent decline in the number of housing starts and the slowing down of business construction.

THE slackening of housing started over the past couple of months or so is not regarded generally as serious nor that there is a lessened demand for dwelling units. On the contrary, surveys by the Federal Reserve Board indicate the opposite.

However, apparently the market for homes in the higher priced classes is softening. The number of buyers who can afford to invest \$18-\$20,000 or more in a home is rapidly disappearing. And in view of current costs, many builders find it difficult to build a home which they can sell for \$6-\$10,000—which is the price range where a substantial majority are able to buy.

As to the second factor, industrial construction such as factories and shops has been on the decline for most of 1948, indicating perhaps that many of the postwar expansion projects are nearing completion and that industry wants to look a little more closely into the future before making new plans. This type of construction is currently running 20 pct (dollar volume) under last year.

But acting to keep the overall business construction a little above 1947 level has been the sustained volume of commercial building such as stores, office buildings, warehouses and other mercantile establishments. The dollar volume in this field continues somewhat above last year's rate.

IT is noticeable that while business expenditures for construction remain the same as last year, the number of individual projects are declining.

For instance, permits issued in

July and August 1948 for the erection of factories and workshops totaled 1650 as against 2375 for the same 2 months last year. Permits for new stores and such establishments in the retail field amounted to 6810 as compared with 8060 for July and August in 1947.

This year's increase in public works expenditures is currently running 5 pct behind the overall average increase in construction rates. This does not mean, however, that the government is running dry on plans; it has merely shelved a number of pet projects until materials have become more plentiful and the money has been appropriated.

General Philip B. Fleming, head of the Federal Works Agency, recently estimated that needed public works over the next 15 years approximated \$75 billion. Stretched out over such a period, this would require public construction in the amount of \$5 billion annually of which the federal government would contribute about a third.

The present backlog of specific proposals for state and local public works projects and which now await approval is estimated variously at from \$10-\$15 billion. Additional projects are being studied.

AMONG the projects specifically or generally authorized are included plans for \$3 billion worth of river, harbor and flood control work (under Army Engineers); \$1.7 billion in reclamation projects; \$2 billion for rural electrification; and more than \$2 billion for miscellaneous works including nearly a billion for forest roads and trails.

Proposed federal highway aid projects under the Public Roads Administration are excluded from the foregoing estimates. This alone is expected to reach \$2.5 billion a year including \$500 million in federal aid.

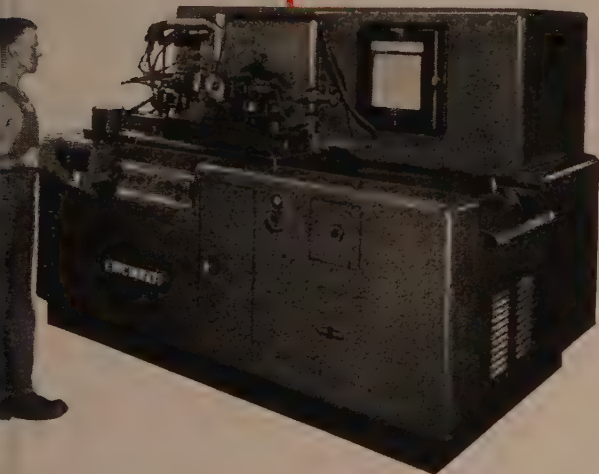
Work which is being planned but has not yet been authorized amounts up to another \$9 billion. This, the governmental agencies say, is being held in reserve to be put forward at the proper time—presumably when private employment starts a decline. Included in



**multiplied
daily production
nearly 3 times**

size and material	6 1/4" O.D., 7/8" face, SAE 8640
hardness	54-56 Rc

	previous method	flamatic method
hardening time	47 seconds	22 seconds
production	280 per day	800 per day



800 gears—a day's production

Boxed, stacked, and ready to ship are 800 spur gears—one day's production on the Cincinnati Flamatic Hardening Machine serving the O. T. Muehlemeyer Co., Rockford, Ill., heat treater who likes to keep customers happy with prompt deliveries. This spur gear (6 1/4" O. D., 36 teeth, 6 pitch, 7/8" face, SAE 8640) is Flamatic hardened in the range of 54 to 56 Rc (50 Rc minimum specified) to a depth of approximately 1/8". Root sections and core are unaffected. Distortion, negligible.

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THE CINCINNATI

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HARDENING MACHINE



THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

these is a \$2.5 billion sea level canal to be constructed as a defense measure (for use as an alternative to the Panama Canal); another \$3.5 billion in varying power and irrigation projects; and, an additional \$1.5 billion in river and harbor projects. These proposals include the long and highly debated St. Lawrence Seaway.

PLANs for these projects are all the more interesting in view of the fact that a moratorium is supposed to have been declared upon all but the essential programs in order to combat inflation and conserve building materials. Since the government's own figures show that it has embarked already upon a \$15-billion program, a great deal depends upon the definition of essential.

The catch is that a great deal of the relatively small amount now being spent for public works is going into what might best be termed starts. Additional billions will be needed to complete them. A study of the complex budget submitted by the White House to the 80th Congress last January revealed that in order to continue and complete projects then already started, something like \$9 billion

would be needed after 1948. A large proportion of this huge sum would be needed for the years 1950 and 1951.

Survey Indicates That More Coal Moves Daily On the Nation's Roads

Washington

... Every day finds more coal carried over the nation's highways, according to J. T. Callaway, president of the American Road Builder's Assn. At present about 50 pct more coal is shipped by truck than before the war.

This means that about 50 million tons of coal were hauled directly from the mines to consumers last year, a Dept. of Commerce survey reveals.

During this 7-year span, the amount of truck shipments of coal increased by 16 million tons; the increase was over 7 million tons in 1947 as compared with 1946.

The Association of American Railroads soon after the war asked shippers all over the country why they used motor carriers. They replied that trucks offered faster, cheaper, and more convenient ser-

vice than competing forms of transportation. Trucks move faster because they can travel at any time at an average speed of about 30 mph as compared to 15.7 mph for freight trains.

In addition, motor carrier rates are generally lower than those of other carriers, the service offered by trucking concerns is increasingly reliable, and the shipper can expedite his deliveries by dealing with one organization that handles all phases of the shipment, including pick-up and delivery.

12 Surplus War Plants Ready for Moth Balls

Washington

... A group of 12 government surplus war plants has been turned over to the Federal Works Agency as the first of perhaps 100 such facilities to be maintained in a standby status for defense purposes.

The plants involved cost the government \$146 million to build and equip. They will be reconditioned and then put in mothballs and guarded by FWA against emergency need.

Under statutes enacted by the last Congress, in addition to the war plants and equipment, FWA will store and maintain 50,000 or more machine tools. Congress has provided an initial \$5 million for the purpose and authorized FWA to contract for an additional \$5 million of work.

Also expected to be transferred to FWA shortly are the Kentucky Ordnance Works at Paducah, Keystone Ordnance Works at Meadville, Pa., and Plum Brook Ordnance Works at Sandusky.

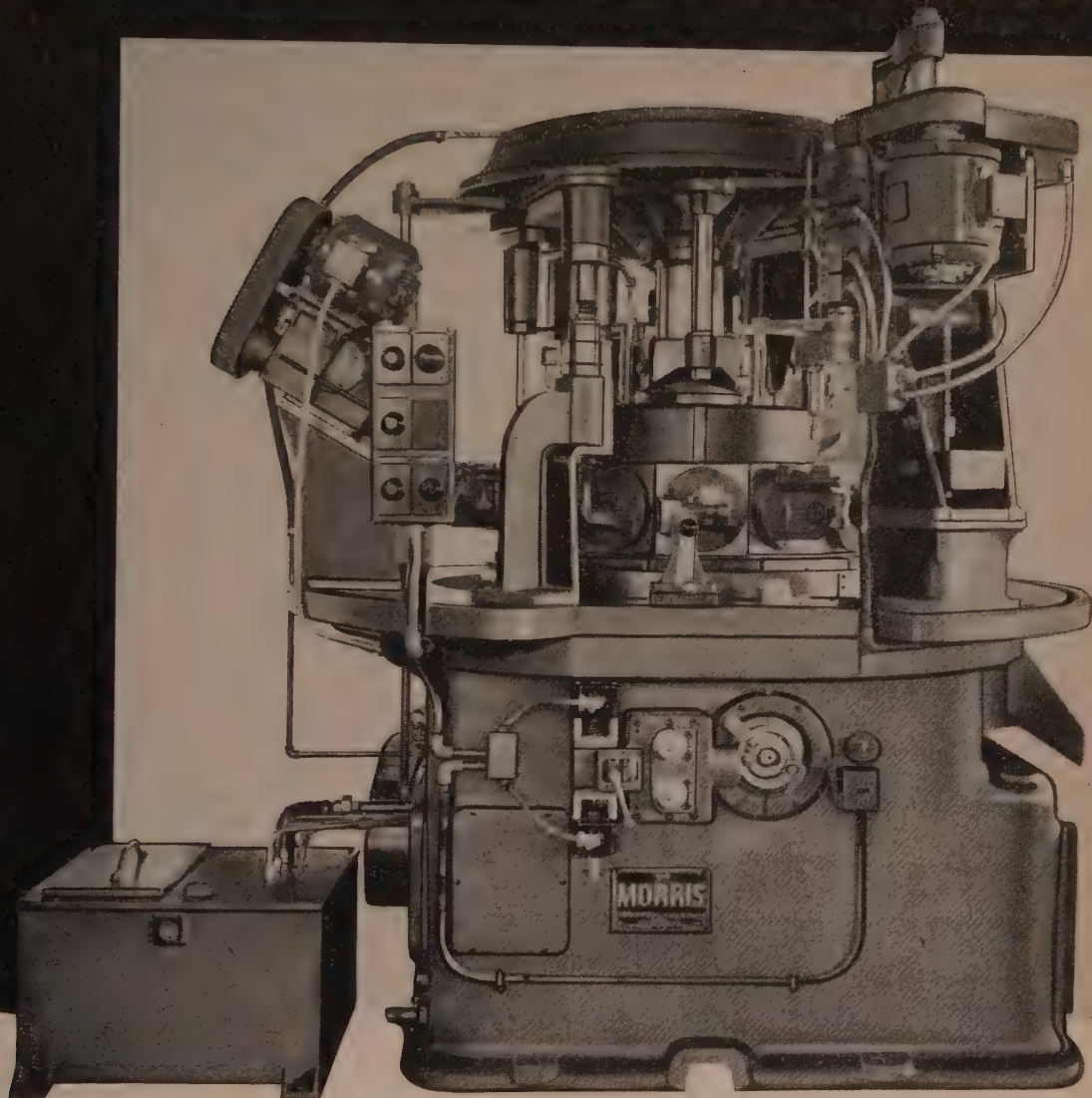
Those transferred to the reserve last week were Alcoa's plant at Riverbank, Calif.; Amco Magnesium Corp. plant at Wingdale, N. Y.; Badger Ordnance Works, Baraboo, Wisc.; Bethlehem-Lebanon Forge Co., Lebanon, Pa.; Diamond Magnesium, Painesville, Ohio; Dow Chemical Co., Freeport, Texas; Dow Magnesium Corp., Velasco, Texas; Gary Armor Plate Plant, Gary, Ind.; Magnesium Reduction Co., Luckey, Ohio; New England Lime Co., Canaan, Conn.; Permanente Metals Corp., Manteca, Calif.; Oklahoma Ordnance Works, Pryor, Okla.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Production is Automatic on this
MORRIS MOR-SPEED Production Machine



● High production and low costs are essential under prevailing conditions today. To help you meet these conditions at favorable costs Morris has developed a line of Mor-Speed Production Machines. Each machine is designed to handle a specific job and to obtain maximum production. For example the Morris center column machine illustrated performs six operations—drilling—reaming—facing—spot facing—chamfering—and tapping simultaneously on automotive carburetor air horns.

Thus producing a finished piece at every index of the fixture holding table.

Production is continuous as the twelve fixtures index automatically and operator unloads finished jobs and loads new piece at each index of the table.

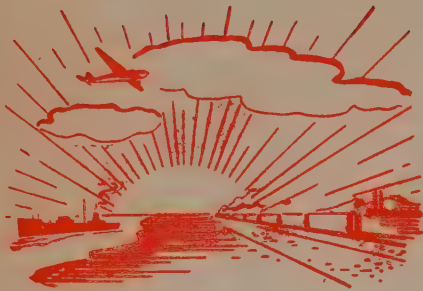
If you are interested in high production and low costs consult Morris—they have the engineering experience and manufacturing "know-how" to design and build equipment to meet your specific job needs.

Write for complete details.



The MORRIS Machine Tool Co.
 CINCINNATI 3, OHIO

• Pacific Coast maritime strike slow-moving rather than violent . . . Strike settlement apparently in offing . . . Hearings continue on Geneva-to-Pacific Coast freight rates.



SAN FRANCISCO—Neither national elections, involving California's Gov. Earl Warren as the first national candidate from west of the Rockies, nor coastwide maritime and oil refinery strikes that have involved over 50,000 workers for over 2 months and closed all Pacific ports except Tacoma, nor even the intercollegiate football season and a fairly serious incidence of polio have seriously disturbed the calm and apparently steady progress of the baffling and busy West Coast.

Except for occasional noisy massed pickets around a congressional hearing, or a steamship office, it has been more business-as-usual and persistent, constant pressure, whether it be for housing or hotel and plane reservations or pipe or plate or sheet or merely seats on the 40-yard line.

But behind the orthodox and dull headlines and the unnewsworthy daily and weekly and monthly problem of absorbing and adjusting to a coastwide population gain in the last 8 years ranging from 31.1 pct, more than 3 million persons in California to 43.3 pct, 751,000 persons in the state of Washington and 49.2 pct, 455,000 persons in Oregon,

there is coming to be general agreement among thoughtful, business executives that this part of the United States is being subjected to a particularly intensive attack at this time by the Communist party-liners.

The Waterfront Employers Assn. of the Pacific Coast and the Pacific American Shipowners Assn., jointly representing the employers affected by the current maritime strike, have bluntly stated that the issue is the Communist party-line leadership of the CIO Longshoremen's and Warehousemen's Union and the Assn. of Marine Cooks and Stewards with whom they are at loggerheads. They have declared and are holding firmly to their resolution that they are ready and willing to negotiate a contract with responsible union leadership, but that in view of their 14 years of chaotic experience with these two unions, the respective leadership of Harry Bridges and Hugh Bryson cannot be so regarded. They cite some 1400 recorded unauthorized work stoppages in the past 14 years, the fact that in their conduct in the most recent negotiations these same leaders showed they were determined to have this strike despite almost complete concession made by the industry on every important union demand, and furthermore that 28 new strike issues were injected into negotiations only 2 hr before the deadline for the tieup.

Typical of the salacity and point of view of Harry Bridges in his determined and independent direction of the Pacific Coast Warehousemen's and Longshoremen's Union are the following statements of his: "We take the stand that we as workers have nothing in common with the employers. We are in a class struggle, and subscribe to the belief that if the employer is not in business his products still will be necessary and we will be providing them when there is no employing class. We frankly believe that day is coming." (At Seattle, May 14, 1937.)

"We propose that you guys go out of business and we'll make a good stab at putting you out of

business if you propose any such thing" (in a negotiating meeting on May 28, 1948).

"Making profit is not a good reason (for being in business). My view is that the government should take over the industry and take all the profits out of it" (in a negotiation meeting July 19, 1948).

"When this strike is finished, we will be out of business or they (employers) will be out of business" (when the current strike was finally called Sept. 2).

ON the occasion of previous major coastwide waterfront tieups in 1934 when 84 days were lost and in 1936 to 1937 when 98 days were lost, in 1939 to 1940 with 53 days lost and in 1946 when 54 were lost, there was much more impatience on the part of the shippers and communities affected and less unity of purpose and counsel on the part of the waterfront employers and ship owners. It was even suggested then, fairly generally, that they were red-baiters, that they were paying for past sins and that Harry Bridges and his associates in the union leadership were doing a forthright job for their people and were gradually being converted to constructive and responsible bargaining.

This time the situation seems to be entirely different. Business management and employers in all groups throughout the western area seem solidly in sympathy with the stand of the waterfront employers and ship owners. On the surface at least there has been no complaint against shipments by rail, against trans-Pacific and Alaskan air shipments, or against the loss and inconvenience because of transit cargoes tied up.

This maritime strike is big business in a negative sense to the entire West Coast. It is estimated that maritime workers lost nearly \$20 million in wages during the first 2 months of the strike, about half by the longshoremen and a little over half by seagoing personnel. About 30,000 CIO longshoremen and seamen are idle. The Ship-

Le Roi Model 2C Power Unit

Le Roi's L-3460 Engine

Twin Disc

*equips a
revolution*

The "30th Anniversary Issue" of *Production Road* contains other records of power transmission through the years. Write for your copy.

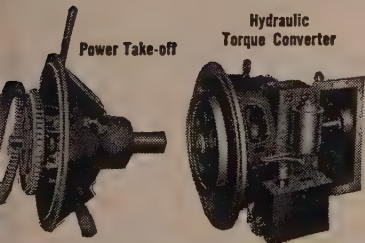


In 1919, the Le Roi Company designed a multi-cylinder gasoline engine which, it has been said, revolutionized construction equipment. The Model 2C Power Unit replaced horses and mules as power for prime moving equipment and steam or single-cylinder gasoline engines for stationary equipment.

This Le Roi Power Unit used a Twin Disc Clutch for power transmission.

Nearly 30 years later Le Roi designed the L-3460, a V-12, 600 hp natural gas, butane, or gasoline engine for the petroleum industry. *This Le Roi Engine uses a Twin Disc Power Take-off for power transmission.*

For three decades manufacturers of heavy-duty equipment, revolutionizing American industry, have found Twin Disc Clutches and Hydraulic Drives efficient power transmission units. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



JUDGE TWIN DISC BY THE COMPANIES IT KEEPS

owners Assn. estimates that 253 ships are inactive and of these 48 have been permanently retired and will not resume operations when the dispute ends.

None of the strikers are subject to state unemployment benefits and their only source of income is in working for the Army one shift out of from 10 to 20 or for field or cannery or job work.

While negotiations are not yet actually under way, a formula for settling this more-than-2-months'

old strike was approved on Nov. 5 by a joint meeting of the Waterfront Employers Assn. and Pacific American Shipowners Assn. Details of the formula were withheld pending action by members and officers of the employers' groups and the unions' and it was expected that negotiations were opened by Nov. 8. The formula reportedly calls for the national C.I.O. to participate in the negotiations, in order to meet the employers' demand for "responsible leadership" in the unions.

ICC Holds Rate Hearings

San Francisco

• • • For 2 full days last week an auditorium at the ordinarily uncommercial public library was crowded with traffic men representing far western heavy industry, steel producers and consumers, chambers of commerce and affected communities for the Interstate Commerce Commission hearing under the administrative procedure act on the long-pending protest filed by competitive steel producers against the current rate for shipping finished steel from Geneva, Utah to Pacific Coast cities, and now in force for shipments by the Columbia Steel Co. over the Western Pacific and Union Pacific (but not on the Southern Pacific, which railroad has never accepted this rate).

The current rate in question is \$11.60 per ton or 58¢ per 100 lb (64¢ to Seattle) and this is a direct descendant of the wartime rate of \$8 a ton or 40¢ per 100 lb filed under section 22 during the war when all shipments were by and for the government. Principal protestants against this rate in the prolonged litigation and at the hearing included Sheffield Steel Co., Bethlehem Pacific Coast Steel Corp. and Kaiser Co., Inc. Some 15 witnesses were examined, none of whom were railroad representatives. In fact, the railroads were silent auditors at this hearing. No decision will be made for some time since litigants have until Jan. 15 to file briefs and until Feb. 15 for their replies.

This rate of 58¢ cwt on finished steel from Geneva to San Francisco and Los Angeles contrasts with the recently filed rate of 38.9¢ cwt on hot-rolled strip which the Columbia Steel Co. has requested the Pacific Freight Traffic Bureau to authorize for shipments after Jan. 1 and the current rate of 30.9¢ cwt on pig iron

from Geneva or Provo to Pittsburg or Torrance, or Fontana, Calif. Although the railroads may be silent observers in the back row at hearings, they are naturally vitally concerned with the postwar rail rate structure now being established on principle steel and steel raw material commodities, and their influence is undoubtedly being exerted, with one eye on competitive traffic and the other on possible returns from these substantial and promising long hauls of bulk raw materials.

Employment Is Up 7 Pct

San Francisco

• • • Strangely enough, the coast-wide maritime strike has had no adverse effect upon manufacturing employment in the Pacific area. Total number of employees in manufacturing industries in California for September is recorded as 799,600 by the State Dept. of Industrial Relations an increase of over 7 pct since the same month last year. Of these, over half are in the durable goods industries. The Employment Security Dept. of the State of Washington reports 190,450 workers in manufacturing in September, of whom 115,350 are in durable goods.

Average hourly earnings for all durable goods workers in California are reported as \$1.594 per hour with 39.2 average hours per week. For iron and steel and their products average hourly earnings are \$1.619 and for workers in blast furnaces and rolling mills the average hourly earnings are \$1.698. Workers in contract construction are the royal princes of the blood, for their average hourly earnings are reported as \$2.093 with special trade electrical work contractors receiving as high as \$2.424 per hour.

Develops Better Ore Reduction Operation

Seattle

• • • Small mine operators (300 during the past 3 months) have been beating down the path to the modest door of E. F. McTarnahan who has developed a better ore reduction mill, now being financed by Rotary Mills Inc. Mr. McTarnahan wanted a more efficient fine-grinding mill, since he finds that present operation absorbs far more than half total milling costs. Present machines, he claims, expend in crushing operation only a small fraction of the total power required to operate them.

The new mill uses one of the oldest principles (the Spanish arrastra). Crushing is done by 9-in., 108 lb steel balls driven free by impellers around a 35½-in. diam saucer at 70 turns per minute. Crushing by impact the centrifugal forces approximately equal 1000 lb balls in gravity type crushing operation.

The ore goes in at the center of the mill, under the balls, and comes out through a screen at the outer edges when ground fine enough to pass through the screen. The machine, Mr. McTarnahan states, has a low-cost, low-power operation, increasing the efficiency and saving power by utilizing gravity, centrifugal force and hydraulic principles.

The mill, the inventor states, has a low initial cost and will be leased to small mine operators. It only requires two men to operate. Motive power is a 10 hp motor, and is adaptable to small diesel or gas generating plants when power isn't available.

The mill has a capacity of up to 1 ton per hour, depending on the hardness of the ore. Less than 100 lbs of material is in the mill at any one time, compared to ½ ton of pulp in the tumble-type mill.

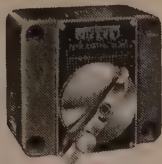
Heaviest part is 900 lb, a factor which will enable the mill to be flown in to remote spots. It occupies a space approximately 12 ft square, and can be set up to run on level ground. Concentrating table, next to the heavy-built tub-like crushing device, is designed to carry the full output of one mill at variable speeds, and it is small, the tables being on 44 x 72-in., in a maximum of three decks.

New and Improved VICKERS PRODUCTS For Better Hydraulic Machinery



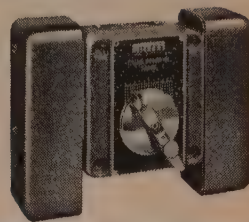
VICKERS CHECK VALVE
(In-Line Type)

For working pressures up to 3000 psi, this compact check valve can be furnished for piping sizes $\frac{1}{4}$ ", $\frac{3}{4}$ " and $1\frac{1}{2}$ ". Data Sheet 13720.



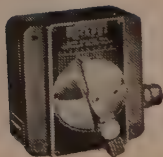
VICKERS FLOW CONTROL VALVE

Accurate control of oil flow in hydraulic systems (independent of pressure variation) can be obtained with this compact, gasket mounted unit. Bulletin 45-35.



VICKERS CYCLE CONTROL PANEL
(Solenoid Operated)

A compact unit for controlling rapid traverse and adjustable feed cycles with fully remote electrical cycle timing. Data Sheet 109164.



VICKERS FLOW CONTROL AND OVERLOAD RELIEF VALVE

Compact metering valve incorporates the Vickers patented flow control and relief valve regulation of oil flow and pressure. Bulletin 48-36.



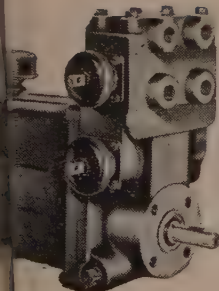
VICKERS RECIPROCATING CYCLE PANEL

For reciprocating cycles of machine tool carriages, etc., with accurate and selective reversal control. Data Sheet 80803.



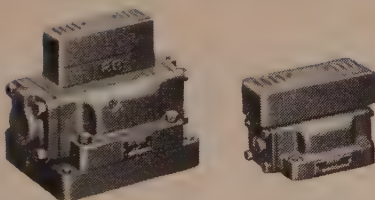
VICKERS PRESSURE SWITCH

Available in two models for pressure ranges 100-2000 and 500-3500 psi with independent pressure differential adjustment. Data Sheet 113929.



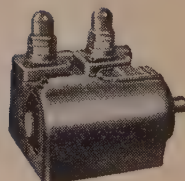
VICKERS POWER PACK

Vane type hydraulic pump, overload relief valve, oil tank, filter and operating valve are included in this low priced unit. Bulletin 46-48a.



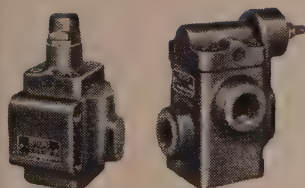
VICKERS SOLENOID OPERATED CONTROL VALVES

Compactness, simplified installation and minimum piping are but a few of many features. Bulletin 48-27.



VICKERS TWO PRESSURE PUMP
(Small)

Two vane type pumps and integral automatic valving, all combined in this compact unit, providing high-low pressure pumping action. Data Sheet 117994.



VICKERS PRESSURE REDUCING VALVES

in accurate reduced pressure; available with integral free return flow check valve, and screw connections. Data Sheets 100165.



VICKERS PRESSURE SEQUENCE CONTROL VALVES

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PERSONALS

• • •

• **Frank B. Rackley** and **Curtis A. Gordon** have been made vice-presidents in charge of sales and in charge of operations, respectively, Jessop Steel Co., Washington, Pa. Mr. Rackley formerly served as general manager of sales; Mr. Gordon as general works manager. **E. E. Bradberry** has been appointed assistant manager of sales in Chicago. Mr. Bradberry had formerly served as stainless sales engineer in the Chicago office of Carnegie-Illinois Steel Corp.

• **Paul G. Mattern**, for over 20 years in the claims department of the Bethlehem Steel Co., Inc., Bethlehem, has been appointed manager of claims of the Bethlehem Pacific Coast Steel Corp., with headquarters in San Francisco, succeeding **Theodore Herman**, who has been transferred to the operating department at Bethlehem's Los Angeles plant.

• **George L. Cobb** has been named district sales manager for Soule Steel Co., with headquarters in San Francisco, having charge of sales throughout northern California and Nevada.

• **G. L. Holt** has been appointed assistant district manager of the Madison, Ill., plant of American Car & Foundry Co., New York. Prior to his connection with ACF, Mr. Holt served as plant manager of the International Railway Car & Equipment Mfg. Co.

• **William W. Acuff** has been appointed regional manager for the eastern region, Building Products Div., Reynolds Metals Co., Louisville. Mr. Acuff has his office in New York. He had formerly been associated with Robert Hetherington & Son as president.

• **D. W. Gunn** has been named assistant to the general sales manager, Radio Tube Div., Sylvania Electric Products, Inc., New York. Mr. Gunn formerly served as special representative for equipment tube sales.



FRANK B. RACKLEY (left), vice-president in charge of sales, and **CURTIS A. GORDON** (right), vice-president in charge of operations, Jessop Steel Co.

• **W. W. Smelker**, formerly assistant general sales manager of Harry Ferguson, Inc., has been appointed vice-president of Newgren Co., Butler, Pa. Mr. Smelker had formerly been associated with Cleveland Tractor Co., Ford Motor Co. and Roderick Lean Mfg. Co.

• **Paul R. Maxey** has been made division engineer, mining division, Armco Steel Corp., Middletown, Ohio. He joined Armco in 1926 and served as engineer, general mine foreman at the Nellis mine and superintendent of the Montcoal mines. **Alva E. Oakley** has been appointed mine superintendent of Mines Nos. 1, 2, 4, and 5, at Montcoal. He joined the company in 1934, serving as assistant foreman, general mine foreman, superintendent of the Nellis mine and outside foreman of the Montcoal mine Nos. 1, 5 and 6.

• **H. Roy Walton** has been named to the newly-created post of assistant eastern sales manager for the Upson Co., Lockport, N. Y., with his headquarters in New York City. **Hugh A. Ward** has been named to succeed Mr. Walton as New York representative. Mr. Ward formerly represented Upson in Cleveland.

• **Garrett C. Van de Riet**, who has been on special assignment in several divisions of the Detrex Corp., Detroit, has been named controller of the corporation.

• **Fred W. Bennett** has been appointed general traffic manager of Sharon Steel Corp., Sharon, Pa., effective Nov. 15. Mr. Bennett succeeds **M. P. Dougherty**, who remains with the company as special traffic representative.

• **John M. Jaycox** has been appointed chief engineer of the Gary, Ind., works, National Tube Co., Pittsburgh.

• **Michael J. Graham**, formerly general manager of the farm tractor division, International Harvester Co., Chicago, has been appointed director of manufacturing. Mr. Graham's functions are the same as those formerly fulfilled by **Karl O. Schreiber**, vice-president in charge of manufacturing, who died. **Eugene F. Schneider**, formerly general manager of the refrigeration division, has been named to succeed Mr. Graham as general manager of the farm tractor division. **Joseph E. Layton** has been named general manager of the refrigeration division, succeeding Mr. Schneider.

• **D. H. Haynes**, vice-president and director of American Machine & Foundry Co., New York, and president of its affiliate, International Cigar Machinery Co., succeeds **John W. Hooper**, as AMF treasurer, effective Jan. 1, 1949. Mr. Haynes' appointment as treasurer is in addition to his current official posts with AMF and ICM which he retains.

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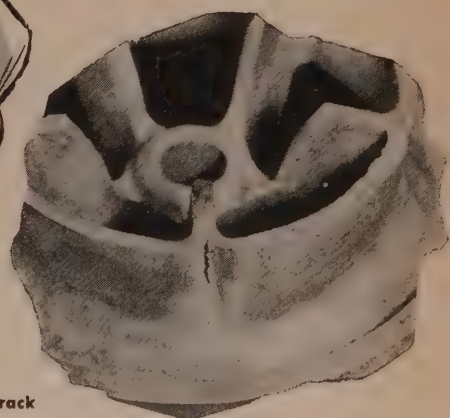
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CLARENCE B. RANDALL, assistant to the president, Inland Steel Co.

• **Clarence B. Randall** has been named assistant to the president, Inland Steel Co., Chicago. Mr. Randall had been vice-president in charge of raw materials since 1930. He joined the company in 1925 as assistant vice-president.

• **J. J. Bourgoine**, vice-president and director of Shaw-Walker Co., Muskegon, Mich., has been promoted to the position of director of all retail sales, succeeding **T. E. Miller**, who died on Sept. 21. Mr. Bourgoine continues to supervise the company's New York activities, which duties he has performed for the past 23 years. **A. R. Hedeman** has been named director of branches outside New York, with his headquarters in that city. Formerly in charge of the company's Boston activities, Mr. Hedeman joined Shaw-Walker sales in 1928.

• **Marcus E. Borinstein**, for the past four years manager of non-ferrous scrap merchandising for the James Flett Organization, Inc., Chicago, has been named vice-president. Mr. Borinstein continues in merchandising and in addition, is general manager of the company's western division.

• **Theodore A. Flach**, production manager of the U. S. Rubber Reclaiming Co., Buffalo, has resigned to become vice-president of W. A. Anderson Co., Inc.

• **W. H. Maskrey**, Jones & Laughlin Steel Corp., Pittsburgh, has become manager of the Electricweld Tube Div., Oil City, Pa., succeeding **R. A. Campbell**, who has resigned. **J. C. Lehner**, who has been works accountant at Oil City, succeeds Mr. Maskrey as general foreman and **W. J. D. Bell**, of the auditing division, succeeds Mr. Lehner as works accountant.

• **Robert P. Rudy** has been named district manager of the New York area for the Materials Handling Div., Market Forge Co., Everett, Mass., with headquarters in New York. Mr. Rudy had formerly been associated with Wright Aeronautical Corp.

• **Charles E. Campbell** has been added to the staff of the sales force of Hanson-Van Winkle-Munning Co., Matawan, N. J., with headquarters in Detroit. Mr. Campbell formerly served as assistant to the chief chemist at Gordon Mfg. Co., Toledo.

• **Lloyd B. Jones** has been retained as consulting engineer, Franklin Railway Supply Co., New York. Mr. Jones was formerly engineer of tests for Pennsylvania Railroad.

• **Gwylm A. Price**, president of Westinghouse Electric Corp., and a member of the board of directors of Baldwin Locomotive Works, Philadelphia, has been elected a member of the executive committee of Baldwin.

• **Ray Sanders** has been appointed assistant general sales manager of Clayton Mfg. Co., El Monte, Calif.

• **Richard C. Lawton** has been appointed district engineer in the territory of western New York for the Torrington Co., Torrington, Conn., with his headquarters in Rochester, N. Y. Mr. Lawton represents the bearings division of the company in Torrington and South Bend, Ind. **J. H. Williams** has been appointed district engineer and **L. A. Toth** has been named district manager of the Dallas office. **J. N. Wholean** has joined the Milwaukee staff as district engineer. **D. E. Lewis** is district manager of the Milwaukee office.



J. CLIFFORD BERTHIAUME, district manager, Nicholson File Co.

• **J. Clifford Berthiaume** has been appointed district manager of the central western territory, Nicholson File Co., Providence, R. I. Mr. Berthiaume joined Nicholson in 1936. In 1946 he was named sales representative with headquarters in Minneapolis.

• **George N. Lilygren** has been elected vice-president of Carrier Corp., Syracuse, N. Y., the duties of which office he performs in addition to those of comptroller of the company.

• **Gilbert W. Chapman**, vice-president in charge of finance of Yale & Towne Mfg. Co., New York, has been elected a member of the board of directors.

• **Edmund T. Flanagan**, manager of New York sales division of the Fairbanks Co., has been appointed manager of regional sales in addition to his present position.

• **Philip R. Kelly** has been appointed director of management research by McKinsey & Co., New York. Formerly assistant to the publisher of Architectural Forum, Mr. Kelly had also been associated with Earl Newsom & Co. and Deskey Associates.

• **Ralph G. Dillingham**, Buffalo district sales office manager of Ford Motor Co., has been named an assistant manager in the New York district. Mr. Dillingham formerly served as advertising manager for the Sterling Engine Co.

Frank F. Ford and **Clement N. Page** have been named sales representatives for the nailable steel flooring, product of Great Lakes Steel Corp., Detroit. Mr. Ford, who has his headquarters in Atlanta, has been connected with the Alloy and Stran-Steel divisions of the company. Mr. Page has his office in Philadelphia. He had formerly been associated with Evans Products Co.

George G. Montgomery, prominent San Francisco corporation executive, has been elected a member of the board of directors, General Electric Co., Schenectady. **Penn Holter** has been named assistant manager of manufacturing, **Charles R. Shields**, manager marketing service, **Charles K. Tanner**, materials coordinator, **Frederick V. Courtade** becomes manufacturing engineer for conduit products division, all the construction materials department of GE at Bridgeport, Conn.

T. J. Zeller has been promoted factory manager of the Allen plant, Mack Trucks Inc., New York, succeeding **C. J. Moran**. **C. Schliewen** has been advanced to manager of the Plainfield, N. J., plant, succeeding Mr. Moran. Mr. Moran has been transferred to Mack's western sales headquarters in Los Angeles.

Carl H. Kindl has joined the staff of the General Motors Corp., Detroit, as assistant to the executive vice-president. Mr. Kindl formerly served with the Delco-Remy Delco Products division of General Motors.

Ronald Q. Kern has joined Dress Engineering Div., Patterson Foundry & Machine Co., New York, and has been appointed director of engineering of that division. Dr. Kern resigned last year from Foster Wheeler Corp. after long term of employment. He has been associated with the graduate school of the Polytechnic Institute of Brooklyn.

Wackley M. Byers has been elected to the board of directors, M. Byers Co., Pittsburgh, to fill the vacancy created by the death of George A. Blackmore.



WALTER O. MELOY, manager of sales, Bar & Semi-Finished Materials Div., Carnegie-Illinois Steel Corp.

• **Walter O. Meloy** has been appointed manager of sales, bar and semi-finished materials division of Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Meloy joined the Gary Works of Illinois Steel Co. in 1924 and went to the sales department in Chicago in 1927. When Carnegie-Illinois Steel Corp. was formed in 1935, he served as assistant to manager of sales of the bar and semi-finished materials division, western area. In 1940 he was transferred to Pittsburgh in the same capacity and in 1945, appointed assistant manager of sales, the position he held at the time of his new appointment.

• **Lin C. Cook**, former Goodyear executive, has been appointed chief industrial engineer for Willys-Overland Motors, Toledo.

• **Ray H. Anders**, manager of the industrial products department, has been named director of purchases of Sun Oil Co., Philadelphia, succeeding **Henry Thomas**, who is retiring. **Roy A. Hurst** assists Mr. Anders in the capacity of assistant director of purchases.

• **A. H. Dill** has been appointed western district manager of the A. B. Farquhar Co., York, Pa. Mr. Dill has been with Farquhar four years as assistant sales manager of Iron Age Farm Equipment Div. New western headquarters for Mr. Dill are in Menlo Park, Calif.

• **Frank E. Houck**, formerly Cleveland district sales manager, Brainard Steel Co., Warren, Ohio, has been appointed manager of sales, steel strapping division. **Charles E. Nail**, associated with sales for the past three years, has been named manager of sales, electric welded tubing division. **Gordon E. Tomb**, of the building productions division, has been appointed manager of sales, Tel-O-Post division.

• **Warren Bicknell, Jr.**, president of the Cleveland Construction Co., has been elected to the board of directors of the M. A. Hanna Co., Cleveland. His election follows the resignation of **Richard F. Grant** from the board of the Hanna Co.

• **L. S. Kimball** has been appointed general manager of the Angier Corp., Framingham, Mass. Previously Mr. Kimball served in key manufacturing and sales positions with Frigidaire division of General Motors Corp.; Sylvania Electric Products, Inc.; Colonial Radio Corp., and more recently with Bell Aircraft Corp. as sales manager of the Prime Mover division.

o o o

OBITUARY...

• **Reginald A. Sully**, 58, former district manager of Linde Air Products Div., Union Carbide & Carbon Corp., New York, died recently.

• **William B. Klee**, 64, founder and president of Damascus Bronze Co., Pittsburgh, died recently.

• **Lester B. Hamersley**, 48, sales promotion manager, Firth Sterling Steel & Carbide Corp., McKeesport, Pa., died Oct. 21.

• **Curtis M. Kreitner**, 59, purchasing agent for the Buffalo plants of E. I. duPont de Nemours & Co., died Oct. 29.

• **Joseph C. Chimera**, 65, retired paint department superintendent of Hard Mfg. Co., Buffalo, died Oct. 29.

• **Howland F. Briggs**, 59, former plant superintendent of Consolidated Packaging & Machinery Corp., Buffalo, died Oct. 26.

European Letter . . .

• Steel Bill badly timed . . . Embitters political passions and courts disunity by distracting attention from more urgent matters . . . Common sense dictates a do-nothing policy rather than compromise prospects of ERP.



LONDON—The Prime Minister was justified, in replying to Mr. Churchill in the debate on the Address, in making fun of the Opposition's complaint that the Steel Bill is badly timed. For Conservatives, no time would be a good time to nationalize steel. Similarly, for many Socialists, it would appear, any scheme of nationalization of any industry, at any time, is good. But for the great mass of people who are neither committed Socialists nor hardened Tories, there are two quite distinct questions. Is it a good thing to bring under public ownership the industry of making iron and steel? And if it is a good thing in general, is this a good time to do it?

To the second of these questions it is surely possible to give a wholly unequivocal reply. There could hardly be a worse time to introduce a measure of this character. Within the industry, the prospect of nationalization must have some unsettling effect and the clauses of the Bill that are designed to prevent the dissipation of assets between now and its coming into force, however necessary and reasonable their intent, are calculated, at least without the most sweeping and emphatic assurances, certainly to delay de-

cisions and most probably to inhibit them altogether. A time when the industry is working to capacity and when every ton of steel it can turn out is urgently needed is not the time to impose these pre-occupations on it. Secondly, within the country at large, the passage of the Bill through Parliament will inevitably embitter political passions and distract attention from far more urgent matters of fundamental policy. The country does not even yet begin to realize the difficulty of the economic adjustments that lie before it, and deliberately to court disunity on a matter that is not urgent is irresponsible folly. Thirdly, the only reason why the British people are

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not being daily brought up, in their individual lives, against the painful realities of their country's economic position is that Britain is still living on lend-lease. The Americans have been meticulous in not interfering in domestic political concerns; but they have not concealed their dislike of the project of nationalizing the steel industry. It is surely only common prudence not to do anything, if it is not strictly necessary, that might compromise the future prospects of the Marshall Plan.

THESE three reasons are so conclusive against the timing of the Bill that it is hardly necessary to add that it is also politically foolish. Among the doubtful electors who make or break a Government, it is almost certain that there is a strong majority against the Bill. It will lose the Labor Party seats at the General Election, and many Ministers know it. Why, then, do they do it? The answer is by now well known: because a handful of Ministers who know their minds have established a moral ascendancy over the majority of their colleagues who lack the moral courage to tell their supporters a few unpleasant truths about the party doctrines. The introduction of the Steel Bill is the clearest example west of the iron curtain of the way in which a minority within a minority can achieve its aims.

If the question of timing could be set aside (as, of course, it cannot) and the debate concentrated

on the substance of the proposal then the issues become much more complex. The structure of the steel industry is still much the same as it was in the 1930s, a tightly organized cartel. It is true that a great deal of technical progress has been made in the last decade, that the industry is working efficiently for a moderate reward and that British steel prices are no longer largely in advance of those prevailing in other countries. But these are the phenomena of prosperity; it is not in the years of good trade that the defects of a cartel show themselves. The changes that have occurred since 1938 have been not so much in the steel industry itself as in the circumstances surrounding it, and if those circumstances were to change again, the present steel industry would doubtless slip back to the policies to which so much objection was taken before the war.

IT is, for these reasons, impossible to agree with those who seek to oppose the present Bill by asserting that all is well with the iron and steel industry. The Government would be entirely justified at a more propitious juncture in concerning itself with the organization and policies of the industry. As with the Transport Bill two years ago, so with the Iron and Steel Bill, the independent spectator, admitting that it is right for the state to have a policy about the industry, has to ask himself the question whether the purpose for which the Bill is brought forward is to advance sound policy, and whether the structure laid down in the Bill is in fact likely to assist in that object. In the case of the Transport Bill, the conclusion reached here was that it was nationalization for nationalization's sake and that nobody had begun to think about what was to be done with the industry once it was nationalized. Everything that has happened since—or, more accurately, everything that has not happened since—has served to confirm that judgment. Must it be repeated in the case of steel?

The text of the Bill suggests at least that somebody has been doing some thinking about the particular problems of steel. Some of

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the proposals are familiar from past essays in the art of nationalization. The compensation clauses, for example, are as objectionable as ever. Indeed, they are more so, for not only is the steel industry one that lends itself particularly badly to valuation by the prices that the Stock Exchange happens to set on those marginal amounts of stock that happen to be in the market on a particular day or days, there is also a new factor in the shape of the limitation of dividends that has been applied since the last nationalization Bill went through. To rig the market first and then to make compulsory purchases at the market price is more than sharp practice, it is plain dishonesty. In other respects, however, an effort has clearly been made to avoid following precedent at all slavishly. This is particularly true of the decision to keep the acquired businesses in existence as separate companies, each trading for its own account. There can be no doubt that this is a great improvement on the usual pattern—though it has the disadvantage of leading the Government also to purchase a whole array of subsidiaries trading in all sorts of fields.

A REFINEMENT of structure, however, tells very little about the purpose of the whole proceeding. Can one feel assured that the Government knows what

it is doing in purchasing the steel industry? More than that, can one feel assured that its purpose is a good one? It is astonishing how little evidence there is, in respect of any of the Government's nationalization plans, of why they are brought forward in the first place. The reasons that are usually given in public—and steel is no exception—are either nonsense or else wholly unworthy. There is undoubtedly a great deal of the sheer malicious envy that makes men with a grievance against society want to pull down the mighty from their seats, without thought of the consequences of so doing. The public utterances of Mr. Bevan, the chief instigator of the present Bill, would lead one to suppose that this is his main reason. There is also a lot of talk along the general line that the owners and managers of the steel industry have so much power that they challenge the authority of the state. What sort of power, and when has it been exercised, outside the steel industry itself? It is said that overall planning is impossible without public ownership of so crucial an industry. But what plans has the steel industry refused to abide by? This sort of talk is to obviously *post-facto* rationalization of something already decided on for reasons of doctrine and emotion to cut any ice with the general public.

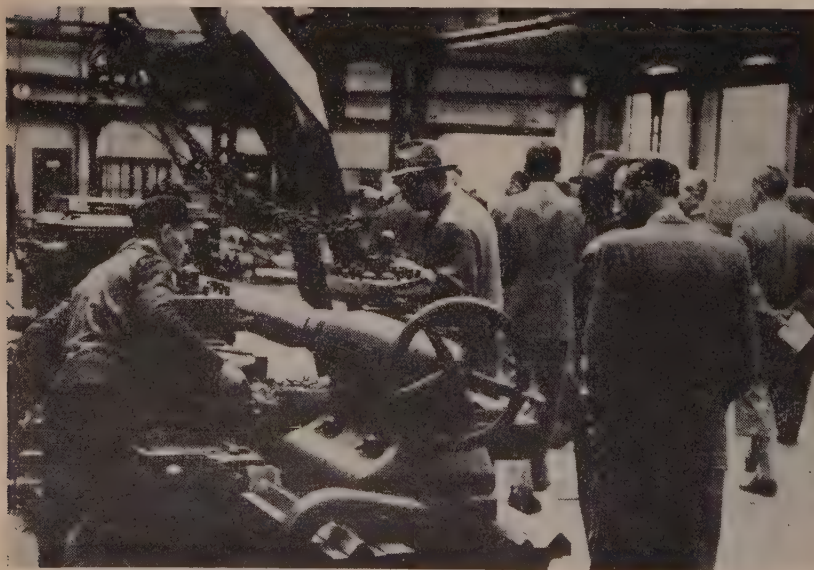
The only rational way of ap-

proaching the matter is to ask what are the chief faults of the present (or, more strictly, of the prewar) organization of the steel industry, and what prospect there is that the enactment of the present Bill would put them right. The main charge in the indictment of the tight steel cartel of prewar years was that it operated in such a way as to keep costs of production far too high. It is not that profits were rapacious, for they were not. But those firms that were lucky enough to be in the charmed circle were virtually guaranteed against serious loss, no matter how inefficient they were, and outsiders, who might have been more efficient, were kept on the outside. The policy was not restrictive in the sense of keeping productive capacity below demand; but it achieved the same result by keeping costs, and therefore prices, too high. Bad trade was not allowed to have its natural effect of killing off the inefficient producers, and good trade was not allowed to have its natural effect of attracting new men with new ideas.

WHAT reason is there to believe that the proposed organization of the industry will remedy these defects? So far as the forcing out of inefficient plant is concerned, the new Corporation will surely be even tenderer to the laggards than the Federation. The Corporation will be able (as the Federation hardly is) to subsidize the inefficient out of the dividends it receives from the efficient, and being able to do so, it will inevitably be under strong political pressure to do so. The record of public ownership is one of slower, not of faster, scrapping of inefficient plant than private enterprise.

Nor is there very much apparent reason to believe that public ownership would lead to lower costs. There are both general and specific reasons for saying this. The general reasons are to be found in the nature of large public monopolies, with their extreme sensitiveness to trade union pressure and the great difficulty they experience in cutting down overheads and effecting economies. This judgment is beginning to be more than amply borne out by the experience of the earlier nationalization schemes.

BREAKING BARRIERS: Here a UN field team studies manufacturing methods in one of Poland's plants in an effort to make suggestions which will increase industrial output. The UN is laying emphasis on the expansion between Eastern and Western Europe without which recovery of the stricken continent can not be complete.



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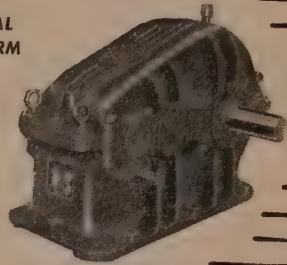


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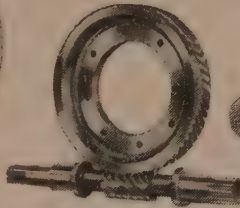
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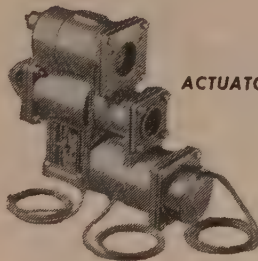
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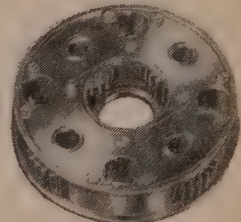
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Industrial News Summary...

- **Election Dampens Steel Spirits**
- **But Production Rolls Merrily On**
- **And Demand Stays at Peak Level**

TO say that the steel industry will not have to change some of its thinking because of the election results would be gilding the lily. For one thing the election caught all steelmakers off base on their hopes—and predictions. So they will find the next 4 years just as tough to take as they have the last 16.

Voluntary allocations, which the industry thought it had settled, are anything but settled. Most steel officials had expected that by the end of February that plan would be out the window. It will be nothing of the kind now. The voluntary allocation plan is now the only thing that stands in the way of a strait-jacket, government imposed allocation plan—something that would be extremely hard to get rid of once it was fastened down.

So some form of allocations is in order as long as the steel shortage exists—and it will exist for the next 6 months at least, and maybe much longer. If steel heads can convince the administration that they again have faith in the voluntary allocation plan—with a few reservations—there is a chance that there will be no strict law. Time will tell. But it will take some backwatering to bring about a compromise.

Steel people have claimed, and still claim, that steel prices must be tuned to raw material, freight and wage costs. If these go up so will steel prices, say steel leaders. That may be true—it would have been truer if Mr. Dewey had won. Cautiousness will be the watchword on steel prices for the simple reason that a bear trap with price teeth in it threatens the industry. Steel prices may not be advanced on an overall basis until and unless steel wages go up again. There is no bar to changes in "extra" charges to bring special services into line with higher costs. This may be in the offing at any time.

Possible Taft-Hartley bill changes mean little to steel people. The strength of the United Steelworkers prevents any change in relations between steel companies and the union. The only possible part a revision might play would be in strike provision changes. As the law stands now it is highly improbable that steel labor would strike over social security or pension controversies—or even over wages. But if the law should be changed to make strikes easier for labor, one might develop in steel next year—if a wage impasse comes.

Hearings now on the basing point v. f.o.b. mill will be no more than window dressing. Any action on that controversy will have to await the next Congress. It will have members in greater number who would be opposed to quickly disposing of the pricing question.

Some steel people do not look for any remedial legislation for return of basing points and freight absorption for some time—if at all.

Hope that the steel industry will not again have to answer questions on adequacy of steel capacity is a forlorn one. There are enough congressmen who stay awake nights thinking about this barb to make it sure fire. This, despite the fact that steel expansions are going ahead as if nothing had happened.

This week the post-election jitters in the steel industry are over. It is doubtful if any steel leaders think the country is going to hell. Their business is to make as much steel and as much profit as they can.

Any statements to the contrary are mainly compensation for nightmares, and the usual club room talk. There is still a good chance that 93 million tons of steel will be turned out in 1949. And steel people think that will more than make up the answer for more capacity. The only fly in the ointment is that an important slowup in steel demand expected by most steel officials by late next year may not come. There is just as good a chance that it won't as that it will.

STEEL demand has paid no more attention to election results than did the majority of voters to pre-election forecasts. It is strong; it is wide; it shows no signs of faltering and it is hitting every steel product. Most steel sales people believed that government spending—houses, roads, power plants—would get a new shot in the arm which would keep steel in a dither. Present plans for highway construction call for more than a million tons of steel a year when present shortages are wiped out.

This week the steel industry's anticipated output reaches 99.5 pct of rated capacity—an all-time high in steel history. Making 88 million tons of steel this year will be easy.

The percent of capacity figure this week may be a little more optimistic than it looks. It is based on capacity as of Jan. 1, 1948. Since that time capacity has been increased but this will not show up officially until some time next year. From a straight tonnage output (not percent of capacity) standpoint the industry is entitled to all the praise it can garner.

The first break in scrap prices since last March occurred this week at Philadelphia. There the average price of No. 1 heavy melting steel dropped 50¢ a ton. This was not interpreted as a definite trend pricewise—yet. No other district reported weakness. The Philadelphia drop reduced THE IRON AGE scrap composite from \$43.16 to \$43 a gross ton, a drop of 16¢ a gross ton.

LOW PRICED PIG—Large tonnages of pig iron from India have begun to arrive in this country for delivery to Eastern Pennsylvania consumers. Lots of 10,000 tons have been bought at prices ranging from \$61 to \$62 delivered.

SCRAP COLLECTORS—Secretary of Commerce Charles Sawyer has appointed a Scrap Iron and Steel Committee to expedite the flow of domestic scrap to steel mills. Members are leading trade association executives representing industries which are potential sources of large amounts of obsolete iron and steel machinery, etc. Members will work directly with Alex Miller, consultant to the department's Office of Industry Cooperation.

OVER THE TOP—The two largest steel mills in the world, Gary and South Chicago Works, Carnegie-Illinois Steel Corp., in October set a peacetime record high for steel production. The total tonnage was 859,650 net tons, with Gary responsible for 491,364 tons and the South Works adding 368,826 tons. In addition to the ingot production record, combined shipments for the two plants reached a new peacetime peak in October.

BACK IN OPERATION—The American Steel & Wire Co., has decided to reopen its Donora Zinc Works which was closed Oct. 31 pending outcome of the investigation by health authorities of the recent fatal smog. Decision to reopen the plant, according to M. M. Neale, general superintendent of the Zinc Div., was reached after representatives of the Pennsylvania Dept. of Health and the U. S. Public Health Service advised public officials of Donora that there was no hazard to the community in resuming plant operations. Numerous control measures have been set up, however, to avoid any future recurrence of such a disaster in the several areas of the United States, where atmospheric conditions are such that they are vulnerable to this type of smog condition.

WHERE THERE'S SMOKE—A spokesman for Portsmouth Steel Co. denied early this week reports that Portsmouth will start construction of a new blast furnace in the near future. The spokesman admitted, however, that a new blast furnace "has been under consideration along with a number of other projects."

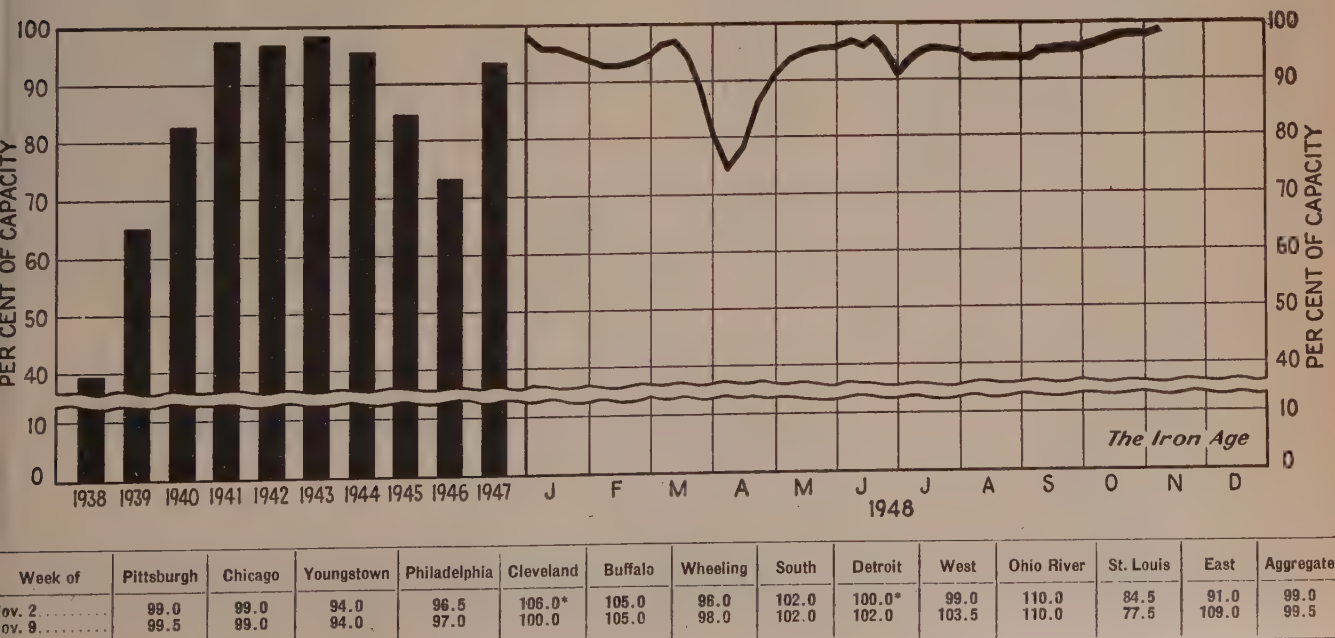
ORE TRIP—Benjamin F. Fairless, president of U. S. Steel Corp., and John G. Munson, vice president of U. S. Steel Corp. of Delaware in charge of raw materials, sailed Nov. 5 for Rio de Janeiro to inspect certain ore deposits in South America. [For a full report on ore potentials in Canada and South America see THE IRON AGE, Nov. 4, p. 152.] U. S. Steel has been carrying on extensive exploratory drilling in districts south of the Orinoco River in Venezuela, where known iron ore deposits of considerable magnitude exist. The corporation has acquired mining concessions in these districts from the government.

FREIGHT CARS—Domestic freight car deliveries during October totaled 8934, according to American Railway Car Institute. September output was 9753. Deliveries during the first 10 months of the year totaled 93,084. Those of the same period last year amounted to 50,040.

BACK AGAIN—General Motors has resumed management control of Adam Opel, A. G., located at Russelsheim, near Frankfort am Main, Germany. Edward W. Zdunek, formerly regional manager for Europe of GM Overseas Operations Div., has been named managing director of the company. The newly elected board of directors is composed of nine American representatives of GM. Elis S. Hoglund, assistant general manager of GM overseas operations, is board chairman. Opel was originally purchased by GM in 1929. Prior to the war it became the largest European producer of cars and trucks, with an annual output of about 120,000.

GADSEN SETTLEMENT—Controversy over the Gadsen blast furnace and coke ovens has ended with Republic Steel Corp. leasing the facilities from War Assets Administration for a 10-year period with option to renew for three 5-year periods. Options to purchase within 8 years were also included. Rental terms are \$1.55 on each net ton of basic or merchant pig iron and 94¢ per net ton of coke. If the purchase options are exercised, the basic negotiating prices would be \$8.5 million for the furnace and \$3.3 million for the coke ovens. Republic's present policy, the company told WAA, is to continue to supply the Southern foundry industry with pig iron equivalent to the capacity of Gadsen "so long as economic factors permit."

Steel Ingot Production by Districts and Per Cent of Capacity



* Revised.

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**J&L
STEEL**



...the original, free-machining, cold-finished open-hearth steel ... for better quality precision parts at lower cost.

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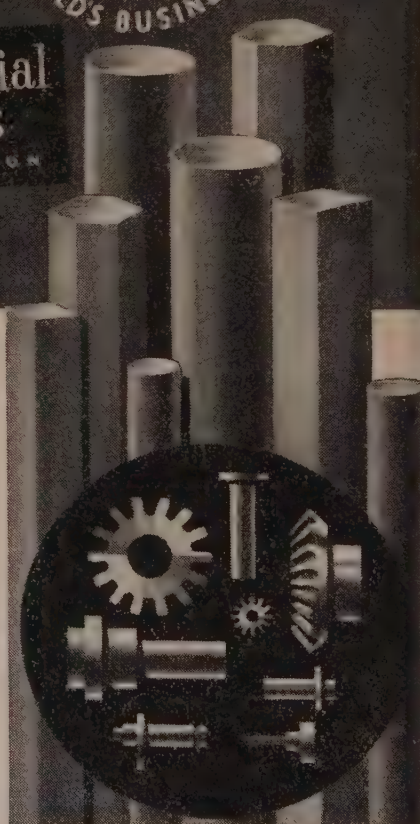
There are some sound business reasons why so many of these working parts are made from J&L *Jalcase*—the original, free-cutting, open-hearth steel:

- *Jalcase* is the leading free-cutting steel—and has been for more than 25 years.

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JONES & LAUGHLIN STEEL CORPORATION

Hoffman Seeking Answer on Germany's Role in European Recovery

New York

• • • What part is Germany to play in the economic recovery of Europe? Will some German industrial plants, now slated for dismantling, be retained in their present locations?

These are two important questions upon which ECA Administrator Paul Hoffman is seeking an early decision. That decision may well affect future events not only in Germany but also in Europe and the U. S.

Technical experts already have begun assembling data in Germany which may weigh heavily in answering these questions.

About 3 weeks ago Mr. Hoffman obtained a moratorium on transfer of German industrial plants, pending a determination of their need there under the European Recovery Program. He was able to gain the unenthusiastic acquiescence of Messrs. Schuman of France and Bevin of England. That he did it by means of a rapid transoceanic flight is indicative of the importance he places on these questions. That he was able to complete the mission and return within 48 hours is a tribute to his energy and ability.

Upon his return, he appointed a German Reparations Survey Committee. George M. Humphrey, president of M. A. Hanna Co., heads the group. Serving with him are John L. McCaffrey, president International Harvester Co.; G. A. Price, president Westinghouse Electric Corp.; Frederick V. Geier, president Cincinnati Milling Machine Co. and Charles E. Wilson, president General Motors Corp.

Upon receiving his appointment, Mr. Humphrey left immediately for Germany to begin his on-the-spot study.

Meanwhile, it became known that Mr. Bevin had been authorized "to consider withdrawing from the reparations list a small number of selected plants for the withdrawal of which a good case can be made out." The French have been less assuring. They have agreed to halt removal of plants slated for reparations until the present study is completed. But the French have

Eventual Compromise Expected With France and Britain On Reparations Plan

• • •

By BILL PACKARD
Ass't News-Markets Editor

• • •

been historically adamant in their insistence that reparations be carried out to the letter, in practice as well as theory.

Those who are familiar with European history readily understand the French thinking on this point. To say that France fears a

strong industrial Germany, is putting it mildly. She has reason. It is no secret that political considerations have been largely responsible for limiting German steel production to 5, then 6, and presently 10.7 million tons annually.

But when Germany's future is viewed from an economic standpoint a far different picture is obtained. Economically, Germany—especially the industrial Ruhr—has long been the most important industrial area in Europe. Industry needs steel. Steelmaking requires steel plants, ore, coke, limestone and good transportation. Germany has all—notwithstanding the fact that she would like to operate her furnaces partly on high

Money—With a String



grade Swedish ore. So would all the European countries.

Politicians view problems through political eyes. Business men view them through business eyes. The present investigating committee is composed of top-notch businessmen. Moreover, the firms which they head would stand to profit by a healthy German economy. They did before the war.

Several straws in the wind already have been indicative of official American thought on this subject. First to be noted was the

general apathy in this country toward the dismantling program. This is cited by some as contributing to the program's falling far behind schedule.

Next was the U. S. initiative in attempting to spur production in Germany—especially steel production. Then came Ambassador Averill Harriman's arbitrary action overruling the European governments' allocation of ERP money. Result of this was to give Germany \$70 million more. This was followed by Mr. Hoffman's determination to review plant dismantling.

Other concurrent events may be cited as contributing to the American viewpoint—or at least spurring it to action at this time. Salient here is an increase of more than 50 pct in German steel production within only 3 months. German steel men were not slow to take advantage of this sensational spurt. They asked the British and U. S. military governors to raise the 10.7-million ton limit on output to 14 million tons annually. Generals Sir Brian Robertson and Lucius D. Clay listened—but didn't comment. As German output approaches its

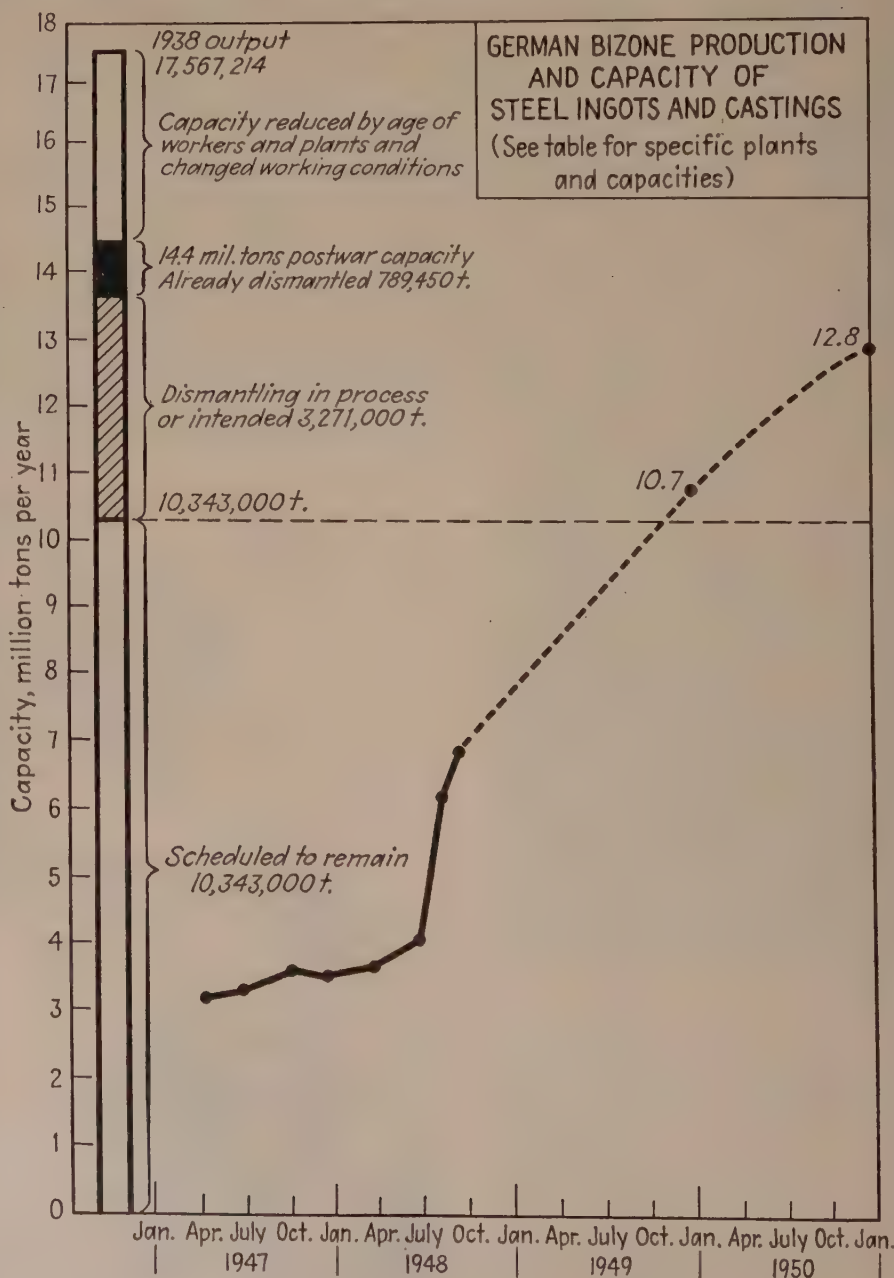
GERMAN BIZONE STEEL CAPACITY Steel Ingots and Castings

PLANTS	CAPACITY TONS PER YEAR
Already Dismantled	
Krupp	629,000
Rheinmetall	123,000
GHH, Dusseldorf	37,450
Total	789,450

Dismantling in Process or Intended	
Bruckhausen	1,270,000
Reichswerke	535,000
Bochumer Verein	320,000*
Huttenwerk Niederrhein AG	300,000
Hattingen	267,000
Annen	140,000
Rheinmetall	130,000
Mannesmann, Gelsenkirchen	130,000
Klockner, Dusseldorf	85,000
DEW, Krefeld	42,000
Reinoldhütte	24,000
DEW, Hannover	18,000
Stahlwerk Mark	10,000
Total	3,271,000

Scheduled to Remain	
Huttenwerk Rheinhausen AG	1,200,000
Huttenwerke Ruhrort-Meiderich AG	1,170,000
Huttenwerk Oberhausen AG	1,000,000
Huttenwerk Hoerde AG	985,000
Huttenwerk Dortmund AG	940,000
Huttenwerk Union AG	900,000
Huttenwerk Huckingen AG	570,000
Bochumer Verein	550,000*
Huttenwerk Haspe AG	530,000
Rheinische Rohrenwerke AG	175,000
Stahl und Walzwerke Grossenbaum AG	132,000
Gussstahlwerk Witten AG	120,000
Stahl und Rohrenwerke Reisholz AG	100,000
Stahlwerke Bochum AG	90,000
Huttenwerk Geisweid AG	75,000
Stahlwerk Hagen AG	42,000
Bocking	40,000
Gussstahlwerk Oberkassel AG	40,000
Eisenwerke Mulheim-Meiderich AG	35,000
Gussstahlwerk Gelsenkirchen AG	24,000
Eschweiler	15,000
Huttenwerke Ilsede-Peine AG	525,000
Georgsmarienhütte AG	264,000
Stahlwerk Osnabrück AG	90,000
Maxhütte Sulzbach und Haidhof	381,000
Annahütte Hammerau	20,000
Rochling-Buderus	30,000
Electric Steel and Other Types (22 Works)	300,000
Total	10,343,000
Capacity available for the 10,700,000-ton plan	10,343,000

* Present capacity 870,000 tons of which 320,000 tons shall be dismantled.



prescribed limit, German steel men are finding plenty of arguments for retention of their plants. Some of the arguments sound good. How valid they are should be determined by the present investigation.

According to present rated capacities of German plants, intended dismantling would leave only 10.3 million tons of raw steel capacity. Not enough to reach the 10.7 million ton limit. Thus any upward revision of output limit would presuppose: (1) Radical revision of dismantling plans, or (2) building new capacity—a highly illogical course.

Nearly all past emphasis on Germany's production figures has been on steel ingots. No thorough study has been made on finished steel production in terms of consumption. This is especially true when the whole of Europe is included instead of just Germany.

This viewpoint has been expressed in trade circles here, as well as in Germany. If steel production—especially finished steel—is geared to a higher practical consumption pattern, it could take the lead off steel production in the U. S. It could do this by furnishing part of what the U. S. is now providing through ECA. Or it could furnish something in addition to U. S. commitments. So goes the argument here.

In Germany the case for study of finished steel output is better prepared. Most any industry source here will gladly furnish figures and graphs showing that if intended dismantlings are fully carried out production of finished steel can never even approach the established limits. This is viewed as especially critical for production of tubes and flat rolled products.

In the case of flat rolled products the damage may have already been done. The huge continuous strip mill at Dinslaken has already been transferred to Russia. This mill amounted to about 35 pct of postwar Bizone capacity. The Germans feel it will be absolutely necessary to build new capacity to replace this equipment. But additional flat rolling capacity is yet slated for dismantling. This is just one example.

Other information of this nature is available—nearly all of it from German sources. Mr. Hoffman undoubtedly has already heard a good portion of it. When he has weighed against the findings of the



Harriman with Hoffman in London.

Humphrey Committee, he hopes to have the answer to Germany's role in European recovery. If he de-

Background

• • • Only 4 months ago German steel production was at the rate of 4 million tons annually. Today the production rate is almost 7 million tons per year.

There are two big reasons for this significant spurt in production. First is the currency reform. Second is a special mission sent to Germany at about the same time to study how to boost German steel production.

Government and Industry sponsors of that mission were in full agreement as to its purposes: (1) To increase the level of German steel production in the interest of European recovery; (2) to reduce the impact of European steel requirements on the U. S. industry.

The Army and State Dept. have never made public the recommendations of that mission. Presumably its report provided the germ from which has grown the current international discussions over the future role of Germany in European recovery. Undoubtedly it will also be weighed and measured alongside the findings of the present investigating committee headed by George M. Humphrey.

But behind it all stands the strong figure of ECA Administrator Paul Hoffman. He holds the purse strings of ERP spending. He also is armed with a clear-cut Congressional directive to seek agreement through channels on the retention of German industrial plants "if such retention will most effectively serve the purposes of ERP."

cides the role should be bigger, he will have to convince Britain and France—especially France.

Accomplishing this might shape up as a real diplomatic shindig. In such event, agreement will ultimately be reached by compromise. Convincing Britain should not be so hard. Since Russia has emerged as the dominant power in Europe, such a move would fit the historic pattern of British balance of power diplomacy.

But France is another matter. The real fears of generations, past and present, will make it hard to lead her far down the path of rebuilding German industry. Still, Mr. Hoffman is holding a pretty good hand.

French Price Index Up

Paris

• • • The average weighted wholesale price of coal has jumped 18.9 pct since Oct. 21 to bring the price of industrial coal up to 3,725 francs from an average of 3,130 francs which existed from Jan. 1 of this year until October.

This increase makes current prices 6 times as high as the average for April, 1945; 21 times the price of August, 1939, and 187 times the price for 1913.

New steel prices effective Oct. 21 are 21 pct over those of July and 16 pct over Jan. 1 of this year. Basic Bessemer bars are 17.5 times higher than in September, 1939; plates are up 16.8 times over the same period and light sheet 17 times. These prices are 150 times the prevailing prices of 1913.

French Strike Takes Toll

Paris

• • • Preliminary reports of French iron and steel production show that recent strikes in the industry have taken their toll. Pig iron output dropped from a monthly average of 608,000 metric tons in August to 507,000 tons in September. Ingot production fell from 607,000 tons in August to 550,000 tons for the same month.

The strike was felt more in the blast furnaces and basic Bessemer converters than in the openhearth and electric furnaces. Rolling mills were not affected nearly as much as melting operations. Steel losses to date have been estimated at 250,000 tons.

Industrial Briefs . . .

• **NEW ELECTRODE**—All-State Welding Alloys Co., Inc., White Plains, N. Y., has announced the immediate availability through its distributors nationally, of a new AC or DC stainless steel welding electrode developed especially to weld stainless steel types 301, 302, 304 and 308.

• **DANES MIGRATE**—The V. Berthelsen Engineering Works, Inc. of Copenhagen, Denmark, has leased a building between Lockport and Joliet, Ill., which will be used for the manufacture of hydraulic automatic hot presses for the plastic and wood-working industries. This is the only American plant operated by this Danish company.

• **PHOSPHORIC ACID**—Victor Chemical Works, Chicago, has announced the opening of its fifth plant at Morrisville, Pa. The new plant will produce phosphoric acid and other phosphate compounds.

• **TO HEAD GROUP**—George Rubine, Hudson Iron & Metal Co., Bayonne, N. J., was elected president of the New Jersey chapter of the Institute of Scrap Iron & Steel Inc. Mr. Rubine succeeds Emanuel J. Moskowitz, Schiavone-Bonomo Corp., Jersey City, who was named chairman of the executive committee.

• **CHICAGO OFFICE**—A new sales office has been established in Chicago by the H. K. Ferguson Co., industrial engineers and builders of Cleveland. It will be located at 120 La Salle St. and will be managed by L. Douglas Lacy.

• **REELECTS OFFICERS**—The National Assn. of Steel Exporters, Inc., New York, have reelected Mauray I. Cohen, Harry Harris & Co., as president. Vice-presidents Benjamin Livingston, Livingston & Southard, Inc.; Jerome Siegel, Titan Industrial Corp.; and Alfred Sonder, Liebermann Waelchli & Co., were also reelected.

• **TO PRODUCE CIMCOOL**—A new plant is being erected on the grounds of the Cincinnati Milling Machine Co. for their Cimcool cutting fluid division. It will have its own purchasing department, chemical laboratories and shipping and receiving facilities.

• **ALUMINUM AGENT**—The American Brass & Copper Co., Oakland, Calif., has been appointed a specialty distributor by Reynolds Metals Co., Louisville, for its aluminum products.

• **OPENS SALES OFFICE**—The Portsmouth Steel Corp., Portsmouth, Ohio, has announced the opening of a sales office in the Penobscot Bldg., Detroit. J. F. Timmerman was named district sales manager for the territory.

• **ADDS TO PLANT**—Nikoh Tube Co., division of International Rolling Mill Products Corp., Chicago, has acquired 6 acres of land adjacent to their present facilities in the Kenwood manufacturing district. The company is erecting a one story building which will be used for the making of electric welded tubing.

• **EXPANSION PROGRAM**—An expansion program costing more than \$100,000, including the construction of two small-parts manufacturing plants and an office building has been announced by Kusic-Haines Mfg. Co., Weirton, W. Va., manufacturers of steel stampings.

• **ELECTS PRESIDENT**—Edward C. Meagher, treasurer, Texas Gulf Sulphur Co., New York, was elected president of the United Engineering Trustees, Inc., New York, at its annual meeting recently.

• **MOVING**—The Hughes-Keenan Corp., Mansfield, Ohio, manufacturers of Roustabout cranes, will be located in Delaware, Ohio, after Nov. 15. This will bring two of the firm's three divisions, the Correct Mfg. Co. and the Hughes-Keenan Co., together on the same property to facilitate cooperation and management.

Hanna Income Increases

Cleveland

• • • **The M. A. Hanna Co.**, reports net profits of \$2,552,749 for the third quarter of 1948 after all charges. The profit is equal after preferred dividends to \$2.38 a share on the 1,030,464 outstanding common shares. In the corresponding quarter last year, net profit was \$2,182,480, or \$2.02 a common share.

Net profit for 9 months of 1948 amounted to \$6,502,417, equal to \$6.02 a common share, and comparing with \$5,214,971, or \$4.76 a common share in the corresponding 1947 period.

Buffalo Bolt Co. Earnings

Buffalo

• • • **The Buffalo Bolt Co.** reported for the nine months ended Sept. 30 consolidated net income available for the common stock of \$1,207,080, equal to \$3.02 a share, compared with \$991,844, or \$2.48 a share, in the corresponding period of 1947.

Consolidated net sales for the 9 months were \$14,675,028, compared with \$11,076,752, and cost of sales increased from \$7,939,325 in the 1947 period to \$10,804,394.

Sloss-Sheffield Reports

Birmingham

• • • **Net income** of Sloss-Sheffield Steel & Iron Co., Birmingham, for the third quarter of 1948 amounted to \$639,992.36 after estimated Federal income tax and subject to annual audit and year-end adjustments.

Net income after Federal income tax for the 9 months ended Sept. 30, 1948, amounted to \$1,778,551.51.

Reports Regular Dividend

Pontiac, Mich.

• • • **American Forging and Socket Co.** reports declaration of the regular first quarter dividend of 12½ cents per share, payable Dec. 1, 1948, to stockholders of record at close of business Nov. 19, 1948.

During the fiscal year ended Aug. 31, 1948, the company paid regular dividends of 50 cents per share and extra dividends aggregating 25 cents per share.

Sale of Copperweld Plant To Borg-Warner Slated for Nov. 15

Cleveland

• • Sale of the Warren, Ohio plant of Copperweld Steel Co. to Borg-Warner Corp., Chicago, will take place Nov. 15, if Borg-Warner can arrange a satisfactory lease for the government-owned facilities at the Warren plant with War Assets Administration.

Copperweld's 10-year lease of the government-owned facilities which include three 40-ton electric furnaces, a 24-in. and a 21-in. mill, expires in 1955.

Purchase price of the plant, including fixed assets and inventory, is believed to be in the neighborhood of \$8 million.

The plant is currently producing tube rounds, ingots, skelp flats and rerolling billets. It has added a stand of rolls for sheet bar production at an estimated \$500,000.

Ingots are first broken down on the 29-in. mill, then go to the 24-in. mill and the new 4-high stand.

• • •

By BILL LLOYD

Cleveland Regional Editor

• • •

A sheet bar piler and crane have been recently installed.

The plant melted 49,600 tons in October and produced, in addition to other products, 11,000 tons of tube rounds. The plant has been melting about 51,000 tons a month, but transformer trouble reduced the October melt about 2000 tons.

Copperweld is also installing a 16,500 KVA transformer, which will enable the operator to get the maximum production from any single unit.

Capital for the sheet bar mill and facilities was supplied by Maremont Automotive Products, Inc., Chicago, which, according to trade sources, is to be paid back in sheet bar tonnage. However,

Maremont will probably be paid off in tonnage by the first of the year if Borg-Warner takes over the plant.

While no official statement was available at press time, it is understood that Borg-Warner will not turn the plant's production primarily to sheet bar but will maintain approximately the present product spread. It was learned that about 7500 tons of sheet bar will go to Borg-Warner's Superior Plant near Canton, which has a contract with Newport Rolling Mill Co. for part of its sheet bar requirements.

Various buyers have been reported interested in the Copperweld plant, which without the DPC melting capacity can melt only 37,000 tons a month. Borg-Warner has been reported negotiating for the plant for more than a year.

Borg-Warner officials declined to comment.

Republic's Long Island City Steel Warehouse Is Nearing Completion

Cleveland

• • Republic Steel Corp.'s new steel warehouse at Long Island City, N. Y., is being built to be the largest serving the greater New York area, is nearing completion, according to an announcement early this week.

Located at the corner of Northern Boulevard and 48th Street, near Flushing Meadows Field, the new warehouse will provide office space for several Republic subsidiary sales offices in addition to warehouse space.

The warehouse will handle the complete line of commodity steel building products of Truscon Steel Corp., a Republic subsidiary, several divisions of Berger Mfg. Div. of Republic, and will house the operations of K & S Metal Supply, Inc., a Republic subsidiary located in Brooklyn.

The office building will house personnel of the Truscon New York offices, the New York sales offices of Berger Mfg. and the K & S organization.

The new building will provide more than twice as much warehouse space for Republic and Truscon as

they now have in the existing Brooklyn structure which has been sold and will be vacated when the new building is completed. It will be served by the Long Island Railroad and will also have four truck docks.

A special feature of the building

will be a new kind of heating system which holds the temperature within the warehouse just above the dew point, so that condensation of moisture on the steel is prevented at all times providing perfect protection for high finished steel surfaces.

MOTHBALLING CHECKED: A sailor uses sand and water blasting to remove the preservative hastily applied after the war. This is being done to determine the effectiveness of the material used. The Navy has some 406 vessels under preservation in the Navy's Pacific Reserve fleet at San Diego.



Predicts 35-Hour Week

Buffalo

••• A 7-hour day and a 35-hour work week by 1950 are foreseen by A. A. Nicholson, assistant to the vice-president of the Texas Co. Addressing the Tri-State Conference of the National Assn. of Credit Men, he said:

"I don't think that is a dream—I think it will be a reality. By 1950, people will be enjoying 60 pct more recreation than today."

Coal Company Earnings Up

Pittsburgh

••• Pittsburgh Consolidation Coal Co. reports profit for the third quarter of 1948 of \$6,527,-949.15 or \$3.02 per share as compared with \$4,555,968.69 or \$2.15 per share for the second quarter. The total of \$6.78 per share for

the first 9 months of 1948 on 2,160,319 shares outstanding at Sept. 30 compares with \$4.25 for the same period last year.

Buffalo Forge Reports

Buffalo

••• Net income of the Buffalo Forge Co. and subsidiaries for the quarter ending Aug. 31 dropped to \$402,706, or \$1.24 a common share, from \$700,153, or \$2.16 a share, in the preceding quarter.

Net in the same quarter for 1947 was \$662,193, or \$2.04 a share. The company's fiscal year starts Dec. 1.

Shipments Increase 10 Pct

Detroit

••• An increase of 10 pct in shipments of resistance welding equipment as compared to the previous month is reported by the Resis-

tance Welder Manufacturers Assn. for Sept. 1948.

Total shipments, according to T. S. Long, president of the association, were more than three times the shipments for the same month of 1939.

Belgium Exports to U. S.

Brussels

••• Belgian exports of iron and steel products to the United States in September totaled 11,476 metric tons. Of this amount, 5410 tons was pig iron, 4508 tons of merchant bars and 1600 tons of hot rolled sheets.

In addition, the Belgian iron and steel company, Esperance Longdoz, has received their first shipments of American cold rolling mill equipment. They expect to have the equipment installed and ready for production some time during the first quarter of 1949.

AMERICAN IRON AND STEEL INSTITUTE SHIPMENTS OF STEEL PRODUCTS ALL GRADES INCLUDING ALLOY AND STAINLESS (Net Tons)

SEPTEMBER - 1948
Month

Steel Products	Number of Companies	Items	Current Month				To Date This Year				Whole Year 1947			
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Per cent of Total Shipments
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	274,586	5.0	285,287	2,285,998	4.7	2,433,885	2,566,748	4.7	2,396,343			
Structural shapes (heavy)	12	2	333,533	6.1	1,926	3,101,452	6.4	19,023	4,436,129	7.0	2,640			
Steel piling	4	3	23,814	0.4	98	220,119	0.5	1,204	324,224	0.5	23			
Plates (sheared and universal)	29	4	572,075	10.4	26,871	5,071,600	10.5	276,530	6,345,216	10.1	219,227			
Skelp	6	5	10,127	0.2	34,926	110,414	0.2	319,741	160,989	0.3	384,004			
Rails—Standard (over 60 lbs.)	4	6	166,311	3.0	820	1,456,863	3.0	9,341	2,207,146	3.5	991			
—All other	5	7	17,504	0.3	21	164,472	0.4	943	211,900	0.3	329			
Joint bars	7	8	10,992	0.2	4,248	102,610	0.2	30,909	173,923	0.3	15,198			
Tie plates	7	9	39,824	0.7	15	370,324	0.8	337	504,779	0.8	4,437			
Track spikes	8	10	13,238	0.3	34	105,834	0.2	558	163,746	0.3	146			
Hot Rolled Bars—Carbon	34	11	523,255	9.5	45,748	4,570,279	9.5	454,717	6,242,416	9.9	745,770			
—Reinforcing—New billet	16	12	111,211	2.0	328	987,149	2.0	4,880	1,277,075	2.0	9,775			
—Rerolled	13	13	17,352	0.3	-	157,450	0.3	-	175,833	0.3	-			
—Alloy	27	14	165,933	3.0	18,555	1,396,782	2.9	159,244	1,741,432	2.8	212,382			
—TOTAL	44	15	817,751	14.8	64,631	7,111,660	14.7	628,841	9,436,756	15.0	967,927			
Cold Finished Bars—Carbon	28	16	112,697	2.1	544	977,614	2.0	4,756	1,426,701	2.3	9,249			
—Alloy	27	17	22,422	0.4	894	169,725	0.4	5,401	218,802	0.3	2,601			
—TOTAL	35	18	135,119	2.5	1,438	1,147,339	2.4	10,157	1,645,503	2.6	11,850			
Tool steel bars	18	19	7,957	0.1	26	64,826	0.1	1,321	87,279	0.1	1,670			
Pipe & Tubes—Butt weld	15	20	182,378	3.3	3,053	1,475,735	3.1	20,911	1,892,691	3.0	78,080			
—Lap weld	8	21	28,794	0.5	-	251,583	0.5	3	389,762	0.6	875			
—Electric weld	13	22	139,327	2.5	564	1,143,726	2.4	3,838	1,254,325	2.0	4,274			
—Seamless	17	23	232,657	4.2	16,915	2,121,767	4.4	127,332	2,581,106	4.1	157,208			
Wire rods	21	24	46,024	0.8	23,148	449,514	0.9	231,350	667,282	1.1	331,192			
Wire—Drawn	39	25	225,671	4.1	15,116	1,962,031	4.1	132,022	2,590,963	4.1	181,783			
—Nails and staples	17	26	71,860	1.3	809	638,818	1.3	9,672	799,436	1.3	8,481			
—Barbed and twisted	15	27	20,921	0.4	1	189,824	0.4	400	256,991	0.4	128			
—Woven wire fence	13	28	33,504	0.6	432	290,331	0.6	2,831	407,295	0.6	3,616			
—Bale ties	11	29	9,685	0.2	-	89,951	0.2	-	119,917	0.2	-			
Black Plate—Ordinary	9	30	66,879	1.2	-	595,555	1.2	654	801,745	1.3	2,033			
—Chemically treated	2	31	1,058	-	-	10,563	-	-	19,252	-	-			
Tin and Terne Plate—Hot dipped	8	32	190,533	3.5	49	1,583,393	3.3	259	2,093,149	3.3	228			
—Electrolytic	9	33	143,661	2.6	-	1,303,861	2.7	215	1,617,659	2.6	529			
Sheets—Hot rolled	32	34	638,880	11.6	48,485	5,721,164	11.9	470,915	7,891,798	12.5	578,426			
—Cold rolled	16	35	578,355	10.5	1,584	5,002,596	10.4	15,378	5,504,578	8.7	28,498			
—Galvanized	16	36	142,967	2.6	155	1,216,285	2.5	2,136	1,609,881	2.5	889			
Strip—Hot rolled	23	37	141,034	2.6	36,479	1,220,510	2.5	268,108	1,740,085	2.7	308,655			
—Cold rolled	34	38	149,529	2.7	2,271	1,301,076	2.7	18,446	1,613,005	2.6	28,030			
Wheels (car, rolled steel)	5	39	26,273	0.5	155	243,388	0.5	881	356,873	0.6	2			
Axles	5	40	18,643	0.3	13	155,249	0.3	116	185,019	0.3	53			
All other	-	41	-	-	-	-	-	-	-	-	-			
TOTAL STEEL PRODUCTS	140	42	5,511,474	100.0	569,570	48,288,449	100.0	5,038,257	63,057,150	100.0	5,717,765			

During 1947 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

Highway Construction Plans Call for Million Tons Steel Yearly

Washington

• • Highway construction plans are in the making which call for more than 1,000,000 tons of steel yearly when present shortages are wiped out.

Projects now being mapped would provide for doubling the present rate of highway expenditure to reach a figure of perhaps \$1 billion annually. This would require from 40 to 50 pct more highway steel than during the last 2 prewar years when such shipments averaged better than 700,000 tons.

This estimate does not take in the indirect demand for steel in connection with highway construction, such as the manufacture of roadbuilding machinery and equipment. It includes only the steel needed for structural shapes, piling, reinforcing bars, culverts, and such other items as go into roadbuilding itself.

Already tucked away in pigeonholes of the planners and pockets of the contractors are approved projects involving expenditure of \$1 billion. And, because of the work backlog created by the wartime slowdown and postwar shortages of labor and material, it is further estimated that it would take another \$15 billion to put the nation's roads into a condition suitable for satisfactorily handling even 1948 traffic.

In the meantime, the traffic load is increasing. Records show 1947 registrations at more than 37 million motor vehicles, including 6.6 million trucks and buses. The Public Roads Administration predicts that this number will increase by more than 10 million within the coming decade.

As a yardstick for measuring highway wear and tear, it is estimated that last year motor vehicles rolled up more than 187 billion vehicle miles. This is only part of the story. It is also estimated that freight transport by trucks amounted to not less than 1 billion ton-miles. These figures do not include traffic on 250,000 miles of urban or city streets.

Carrying this load is a network of something more than 3 million miles of roads. These connect the

Plans Would Require 45 pct More Steel Than Last Two Prewar Years

By KARL RANNELLS
Washington Bureau

16,000 or so villages, towns and cities of the country. But of the total, about a fourth or perhaps 750,000 miles are actually called upon to handle about 90 pct of all traffic.

The immediate problem, then, is not new mileage but putting this 750,000 miles into condition to meet demands. Plans now taking shape provide for wider, straighter, better graded and better surfaced roads, plus elimination of grade crossings.

Roughly, the comprehensive plans now taking shape involve 80,000 miles of state roads which need rebuilding, 14,000 miles of two-lane highways which need widening into four and six lanes.

Major through routes totaling 37,500 miles are to have another 2500 miles added to raise the total to 40,000.

Highway constructors are whittling away at the big backlog at a current rate of \$1.4 billion annually. Ready-to-go projects at the beginning of 1948 provided for construction work on 12,500 miles of highway and erection of 2600 bridges. At the same time, projects involving another 7000 miles and 1250 bridges were awaiting the letting of contracts.

The present expenditure rate for highways compares favorably with the more intensive prewar roadbuilding, including those when WPA poured \$4 billion into "made" highway work. But higher costs drop the actual completed mileage and bridging work considerably below prewar physical volume.

Tonnages of steel needed to take care of this projected program must be estimated in a general way. Prior to the war, steel quantities were figured on a basis of slightly more than 10 tons per average mile of work completed.

TOUGHIE: Peter Payson, assistant director of Crucible Steel's research department adjusts the strain gage as he pulls a tensile test on their recently developed alloy dubbed Hy-Tuff which will find application in the aircraft, automobile and mining industries.



Under loose classification, this was further broken down into 16,000 lb of reinforcing and 4300 lb of structural steel. Just how much this formula is outmoded is anybody's guess.

However, it is no guess that current steel supplies for highway purposes falls far short of projected future requirements.

Last year, a little more than 555,000 tons were shipped by the mills to the highway construction industry. This was about 70 pct of the tonnage for the prewar years of 1940 and 1941. What, if any, quantities of additional steel was obtained on the gray market is unknown.

Even this low figure was a considerable increase over 1946 when highway builders were able to obtain only about 400,000 tons of all types. The low point in highway steel shipments was reached in 1943 with 175,000 tons.

The projected highway program lends an optimistic outlook for an increased and sustained demand for steel from producers of machinery and equipment. Although the present production in general is above prewar levels, the continued shortages of specific materials such as steel sheet and plate have kept crawler type tractors, motorized graders and a few lesser items in somewhat short supply.

All things considered, the goal of \$2 billion to \$3 billion for road expenditures does not seem unduly optimistic—barring a nationwide bust. State imposed gasoline

taxes alone produced more than \$1.2 billion which, technically, is supposed to go into road building. In addition, there are federal contributions and road taxes which go into the kitty.

An economy-minded Congress could put a dent into the program by refusing to appropriate a por-

tion or all of the \$500 million in federal-aid which it now provides annually. The present law, enabling this aid, still has 2 more years to go but there is no requirement compelling such funds to be appropriated. This appropriation, however, represents only about 20 pct of the total highway program

Swedish Stainless Steel Imports Increase Sharply

Stockholm

••• Stainless steel imports to Sweden from the United States have risen sharply over the tonnages received in 1938.

	Imports (Metric Tons)		Exports	
	1938	1947	1938	1947
Tool Steels	9	17	650	433
High Speed	20	246	346	179
Stainless	233	9688	5101	4980

Canada and United States, which formerly were not supplying this market, delivered in 1947 2 and 6 tons of tool steels, 128 and 47 tons of high speed steels and 114 and 9477 tons of stainless steels. Great Britain comes next with 7 tons of tool steels, 69 tons of high speed steels and 95 tons of stainless steels.

The United States developed imports of Swedish sponge iron, which increased from 670 tons in 1938 to 918 tons in 1947 after a top level of 1413 tons in 1946. Iron ore imports, which were low before the war, increased from 314,000 tons to 1,347,000 tons in 1947.

Taking into account imports and exports of all iron and steel products, home Swedish market disposed in 1947 of a much higher tonnage than in the prewar period. It amounted to about 1,400,000 tons against 1,200,000 tons 1946, level which was already above the prewar level.

Before World War I, home consumption did not exceed 400,000 tons. But while total imports from the United States in 1947 amounted to 269,000 tons (against 41,000 tons in 1938), American shipments have been decreasing these last months and Belgium will likely replace the United States this year as main supplier.

Adds More Steel Capacity

New York

••• Steel production made up more than 58 pct of the company's business volume in September, according to C. Russell Feldman, president and board chairman of International Detrola Corp.

The emphasis on steel will further increase within the next few months with the addition of steel-making facilities that will bring the company's output near a rate of 700,000 tons of ingots annually.

A new hot strip mill is under construction at Newport, Ky. which is expected to start rolling slabs in another month. One electric furnace was put into operation last June while a second will begin making steel in January. A third electric furnace will be added in February.

Demands for pig iron from the company's Martins Ferry, Ohio blast furnace continue heavy and the furnace is being pushed to the limit to keep output continuously at a peak.

Coming Events

- Nov. 14-17 National Tool & Die Manufacturers Assn., annual meeting, Milwaukee.
- Nov. 17-18 American Zinc Institute, galvanizers committee meeting, Pittsburgh.
- Nov. 18-19 National Founders Assn., annual meeting, Chicago.
- Nov. 18-19 American Management Assn., production meeting, Chicago.
- Nov. 28-Dec. 3 American Society of Mechanical Engineers, annual meeting, New York.
- Nov. 29-Dec. 4 National Exposition of Power & Mechanical Engineering, New York.
- Dec. 2-4 Society for Experimental Stress Analysis, annual meeting, New York.
- Dec. 2-4 American Institute of Mining & Metallurgical Engineers, annual electric furnace steel conference, Pittsburgh.
- Dec. 6-8 Electric Welding Conference, Detroit.
- 1949
- Jan. 10-14 Society of Automotive Engineers, annual meeting, Detroit.
- Jan. 10-14 Material Handling Institute and American Society of Mechanical Engineers, Materials Handling Show, Philadelphia.
- Jan. 14—Malleable Founders' Society, semiannual meeting, Cleveland.
- Jan. 24-28 American Society of Heating & Ventilating Engineers, annual meeting, Chicago.

British Steel Nationalization Bill Confirms Industry's Fears

London

• • The British Steel Nationalization Bill, introduced into Parliament recently, confirmed the darkest fears of industry officials. For the past 2 years there has been a lot of wishthinking among steel leaders. To say that they knew that nationalization was on the way is to be completely trite. They read the Labor Party platform in 1945. They have been fearing that same party plug for steel nationalization for the past 2 years. Industry leaders knew, too, that the basic economic theories of men of the cut of Sir Stafford Cripps and Aneurin Bevan demand control of steel.

Although they knew these things, it was a mixture of forlorn hope and defiant "You can't do that to us" feeling that led them astray in recent months. They felt somehow that record steel production, no advances in steel prices and ambitious modernization projects might save them from the awful axe. Laudable as the effort has been, it has not even dulled the edge of that axe.

No steel man could explain exactly how the Socialist government could duck its avowed purpose of taking over steel, without losing face with its rank and file. Not many steel men allowed themselves to believe that it would happen.

The nationalization program has its roots too deep in the British labor movement to have been deterred by anything as transient as this year's steel production figures. It was many decades ago, when the Labor Party was abornant, that the Socialist doctrine for control of industry became its cornerstone. Those were black days for much of British labor. The intellectual core of the tiny party decided that the government would acquire control of basic raw material industries, and would thus control all of industry. This is the idea that is dictating steel nationalization now.

There has been no upsurge from

Contents of Bill Were Closely Guarded Secret Prior to Recent Introduction

By F. H. HARLEY
British Correspondent

steel workers demanding it. Although British steel labor called loudly for nationalization many years ago, it is an open secret in London today that steel labor leaders now are much less than enthusiastic about the idea, if not actually against it.

Under the Labor Government's Iron and Steel Nationalization Bill, the text of which was a jealously guarded secret until it

was laid before Parliament, individual companies will continue to operate under their own names and with their existing managers and directors. But the government is to acquire the shares of these companies, on the basis of stock exchange values. It is calculated that compensation to be paid to dispossessed shareholders—in government fixed-interest stock—will amount to \$1.2 billion. The number of workers affected is 300,000.

The Ford Motor Co.'s works at Dagenham, Essex, which includes blast-furnace plant but has no steelmaking facilities, will not be taken over.

The Bill's principal object, as stated in the preamble, is "to bring under public ownership the basic processes of steelmaking." These are defined as: (1) digging of iron ore; (2) smelting of iron ore into pig-iron in blast furnaces;

ON BRITISH LINES: The Vauxhall Co. of Luton has come out with two new models, the Velox 6-cylinder and the Wyvern 4-cylinder. Operating at full capacity, over 150 cars roll off the company's assembly lines daily.



(3) converting pig-iron and scrap into steel ingots; (4) shaping of steel by hot rolling.

The Bill sets up a corporation which will acquire the securities of the major firms carrying on these processes. The firms taken over number 107, but many of them have subsidiaries which they will bring with them.

The corporation, through its acquired companies and the subsidiaries which go with them, thus becomes responsible for some activities outside the four basic processes, in some cases even going as far as the finished article. But it is not the intention of the Bill to nationalize finished products otherwise.

Of the small concerns not taken over, those producing up to 50,000 tons of ore per annum or 20,000

tons of other products will need and receive licenses to continue. Those producing less than 5000 tons per year may continue without license.

On "vesting day," when the corporation takes over securities, the company directors and workers will be responsible not to private shareholders, but to one shareholder, "The Iron and Steel Corp. of Great Britain." Steel users will be protected by consumers' committees.

The Iron and Steel Corp. of Great Britain will consist of a chairman and 4 to 10 others appointed by the Minister of Supply. They must not be M.P.s. They must have no financial or other interests which would affect their work as members.

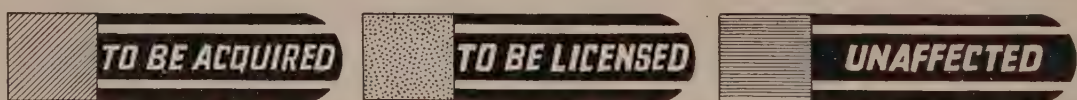
The corporation must provide

iron and steel at prices, in quantities and of qualities best suited in its view to the public interest. It must carry out any general directions given by the Minister and discontinue or restrict its activities if so instructed by the Minister. In both cases the Minister will act only after consultation with the corporation. Its plans for development, training and research shall be on lines approved by the Minister. It will give the Minister all the information on its activities that he requires and in particular an annual report to be laid before Parliament.

The Minister may pay subsidies to the corporation on certain imports.

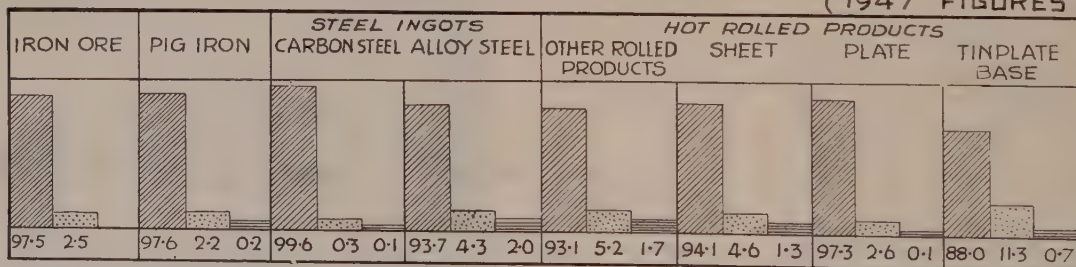
The securities of the companies named in the Bill—there are 107 of them—shall be transferred to

British Firms to be Acquired, Licensed or Not Affected



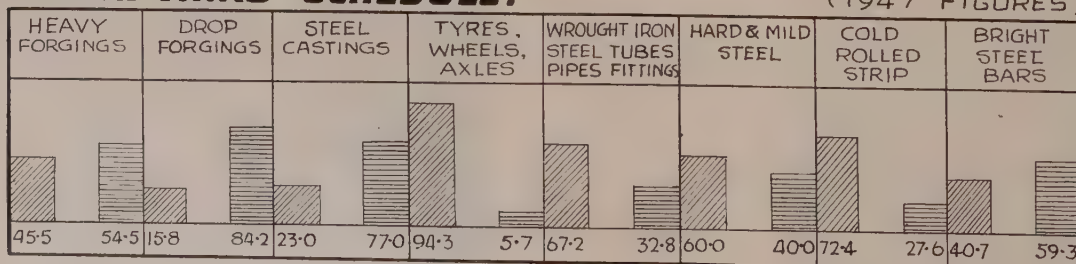
APPROXIMATE PERCENTAGES OF PROCESSES TO BE ACQUIRED OR LICENSED, OR WHICH ARE NOT AFFECTED.

(1947 FIGURES)



APPROXIMATE PERCENTAGES OF OTHER PROCESSES TO BE ACQUIRED BECAUSE THE PARENT CONCERNS ARE LISTED IN THE THIRD SCHEDULE.

(1947 FIGURES)



the corporation on May 1, 1950, or any later date up to 18 months after the passing of the act that the Minister may appoint. The list of companies named is made up of those whose average output in 1946-7 reached any of the following figures:

Activity	Minimum Output Qualifying for Acquisition	Minimum Output Requiring License
1. The working and getting of iron ore	50,000 tons	5,000 tons
2. The smelting of iron ore in a blast furnace with or without other metalliferous materials	20,000 tons	5,000 tons
3. The production in the form of ingots of steel (including alloy steel)	20,000 tons	5,000 tons
4. The changing of the cross-sectional dimensions or cross-sectional shape of steel by hot rolling in a rolling mill	20,000 tons	5,000 tons

Compensation for acquired securities will be made by the issue of "British Iron & Steel stock" equal, in the opinion of the Treasury, to their value (stock exchange) on the general date of transfer.

Any transfers between the passing of the act and the vesting day of iron and steel works by affected companies are void unless approved by the Minister. Assets transferred in that period may be recovered. Directors may be liable

for capital distributions to members. Transactions resulting in dissipation of assets may be reopened after taking over, and directors may be liable for losses.

There is to be consultation between the corporation, the Gas

Council and the National Coal Board over carbonization development.

The corporation is liable for the debts of acquired companies.

The nationalization of the British steel industry has been brewing for a long time. It should surprise no one. How the industry will fare as a result of this bold experiment in socialism can only be recorded by time.

Canada Seeks Scrap In Junkyards of the World

Ottawa

• • • Steel Controller F. K. Ashbaugh says Canada's critical steel shortage has forced the country to start a search for iron and steel scrap in the junkyards of the world.

The word has gone out from the trade department to Canada's trade representatives. Negotiations are being made in Hong Kong, Singapore, Australia, Japan, South America and Germany to buy whatever is available.

So dark is the picture that all Canadian industry and construction, with the exception of housing, is feeling the pinch, Mr. Ashbaugh said.

He added that to the man-in-the-street the shortage is a vague and uncertain problem. But it might become real to him in shortages of Canadian-built automobiles, refrigerators, stoves and furnaces if the dearth of steel continues for any length of time.

These industries have been asked to "fend for themselves" to buy steel wherever they can until the problem is solved. One gleam

of hope is in the Montreal report of an electrical steel-refining process that cuts the job from 24 hours to 30 minutes. But the "refining-by-electricity" process, still in its pilot stages, is a "revolutionary" process for the future.

What is needed, said Mr. Ashbaugh, is about \$20 million worth of blast furnaces, coke ovens and openhearths as soon as possible. Biggest news for Ontario is that a \$15 million blast furnace may be built in that province. One location under consideration is Sault Ste. Marie.

The government is prepared to shoot the works on costs. A cabinet spokesman told the Canadian Press the government is willing to subsidize steel construction costs. "It will do everything within its power to alleviate the shortage." The government also has ordered Trade Dept. supervisors to survey Canadian scrapyards for an estimate of what can be made available to the steel industry.

Canada's current steel shortage is estimated at 1 million tons of ingots a year. She also requires another 200,000 tons of scrap a year.

Ore Research Is Now A Separate Part Of J&L Technical Dept.

Pittsburgh

• • • H. W. Graham, vice-president and director of technology, Jones & Laughlin Steel Corp., has announced several important changes in the corporation's technical department for the extension of research and improvement of technical service. Three parallel and organizationally equal divisions of research have been created.

Because of its rapidly increasing scope and importance, ore research is now recognized as a separate research division under the supervision of F. X. Tartaron, manager of ore research. The Hazlewood laboratory group will carry on as the division of metallurgical research under the supervision of Dr. H. T. Clark, manager of metallurgical research. The third research group is the division of coal and coke research under the supervision of C. L. Potter, manager of coal and coke research. Messrs. Clark, Potter, and Tartaron, as managers of their respective divisions, will report directly to H. W. Graham and to his assistant, D. T. Rogers.

Concurrently with these changes, Dr. H. K. Work, who has previously supervised metallurgical and ore research, will join the office of the director of technology as a staff assistant with responsibility for research planning.

J. E. Morris, formerly Research Engineer on a special development problem at Benson Mines, will become a member of the office of the director of technology as staff technologist to assist in the work of the technical department.

The research, investigation, and development now carried on in the plants will continue under the direction of the supervisors of the various plant technical groups.

Monarch Reports Dividend

Sidney, Ohio

The directors of The Monarch Machine Tool Company, Sidney, Ohio, today declared a dividend of 50 cents per share, payable Dec. 1, 1948 to shareholders of record Nov. 18, 1948.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 900 Tons, New Bedford, Mass., boiler house addition for New Bedford Gas & Edison Co. to A. O. Wilson Structural Steel Co., Cambridge, Mass.
- 700 Tons, Charleston, S. C., extension to power plant for South Carolina Power Co., to Virginia Bridge Co., Roanoke, Va.
- 600 Tons, Lancaster, Pa., store for F. W. Woolworth Co., through Turner Construction Co., Philadelphia, to Bethlehem Steel Co. Inc., Bethlehem.
- 500 Tons, Wilkes-Barre, Pa., store for F. W. Woolworth Co., Philadelphia, to Bethlehem Steel Co. Inc., Bethlehem.
- 500 Tons, Trenton, N. J., store for F. W. Woolworth Co., through Turner Construction Co., Philadelphia, to Bethlehem Steel Co. Inc., Bethlehem.
- 500 Tons, Philadelphia, brewery for C. Schmidt & Sons, to Morris Wheeler & Co., Philadelphia.
- 460 Tons, Scranton, Pa., Catholic youth center, to American Bridge Co., Pittsburgh.

- 375 Tons, Harrisburg, Pa., store for S. Kresge & Co., to Bethlehem Contracting Co., Bethlehem.
- 330 Tons, Fitchburg, Mass., power house for Fitchburg Gas & Electric Co. to Haarmann Steel Co. Holyoke, Mass.
- 300 Tons, Bangor, Me., tank for Webber Oil to Hammond Iron Works, Warren, Pa.
- 300 Tons, Chicago, Chicago Transit Authority bus terminal, through J. J. Duffy Co. to American Bridge Co., Pittsburgh.
- 200 Tons, Fleetwood, N. Y., 2 6-story apartment houses, to Grand Iron Works, New York.
- 175 Tons, Peoria, Ill., power plant for the State Hospital through S. N. Nielsen Co. to Duffin Iron Co., Chicago.

• • • Fabricated steel inquiries this week included the following:

- 880 Tons, Pittsfield, Mass., shops for General Electric Co. Charles T. Main Inc., Boston, Mass.
- 325 Tons, Coram, Mont., outlet for the Hungry Horse Reservoir U. S. Bureau of Reclamation Specification 450.

- 250 Tons, Ardmore, Pa., store for Strawbridge & Clothier Co., due Nov. 13.
- Ill. State Highway bridge projects, bids close Nov. 16 on the following:
- 460 Tons, Madison Co., Ill., Section 202 EF.
- 380 Tons, Lake Co., Ill., Section 4-2F.
- 315 Tons, Brown Co., Ill., Section 18F.
- 175 Tons, White Co., Ill., Section 1F.
- 140 Tons, McCoupin Co., Ill., Section 18F.

• • • Reinforcing bar awards this week included the following:

- 245 Tons, Wausau, Wis., Warehouse for the Marathon Corp. to Permanent Construction Co., Chicago.
- 225 Tons, Chicago, Merrimac office building for Illinois Bell Telephone through Herlihy-Mid Continent Co. to Jos. T. Ryerson & Son, Inc., Chicago.
- 200 Tons, Kankakee, Ill., acute hospital for the state of Illinois, John Moroff & Son, previously reported low bidder. Job has been rebid and W. E. O'Neil Construction Co. now low bidder.
- 100 Tons, Cicero, Ill., St. Francis of Rome school building to Van Etten Bros. Co., Chicago.
- 100 Tons, Chicago, warehouse for Time, Inc. through S. N. Nielsen & Co. to Bethlehem Steel Co., Inc., Bethlehem.
- 100 Tons, East Boston, Mass., storm drainage system, General Logan Airport through George M. Byrne to Bethlehem Steel Co., Inc., Bethlehem.

• • • Railroad car awards and inquiries this week included the following:

The Mississippi Central has ordered 100 50-ton box cars from Pullman Standard Car Mfg. Co. Chicago & Northwestern has ordered 242 50-ton box cars from Pullman Standard. The Southern Ry. has ordered 50 50-ton box cars from Pullman Standard and Green Bay & Western R.R. has ordered 20 50-ton hopper cars from Pullman Standard. The Missouri Pacific will rebuild 500 hoppers and 500 gondolas in their own shops. The Wisconsin Central R.R. plans to buy 20 70-ton covered hoppers providing they can get court approval.

Shipping Lines Purchase Steel Cargo Containers

Pittsburgh

• • • To protect cargo from pilferage and damage in shipment, four more steamship companies and a railroad have adopted the use of Dravo steel Transportainers. The weatherproof shipping containers hold up to 6 tons in 275 cu ft of shipping space. In addition to protecting cargo they speed handling and allow packaging of export cargo in domestic wrapping, according to Dravo engineers.

The companies are U. S. Navigation Co., American Israeli Shipping Co., Furness Withy & Co., Ltd., and Panama R.R. Co., all of New York; and Gulf & South American S.S. Co., New Orleans.

Furness Withy ordered six of the weathertight, pilferproof Transportainers for shipment of valuable cargo between New York and Bermuda. Because of difficulties with present methods of shipment, U. S. Navigation Co. acquired one Transportainer on an experimental basis for shipping bottled acetic acid to India.

30 YEARS AGO

THE IRON AGE, November 9, 1898.

• "After years of struggling with every imaginable device to overcome destructive and senseless competition, the leaders in the iron industry seem to have reached the conclusion that consolidation alone holds out a promise of profits. The concentration of power in the hands of a few, with its opportunities for despotic, unfair and discriminating action, is regarded by some as an element of serious danger to the smaller manufacturer."

• "In the course of a speech at the formal dedication of the Carnegie Library at Homestead, Mr. Carnegie stated that operations for the past year showed that the average paid man and boy, common labor included, was \$2.91 per day or \$905 per year. The men are said to be making more money than they have made for years."

• "The injury to cast iron water pipe by electrolysis in Dayton is so great that stones and pebbles near the pipe are actually electroplated with metal from the pipe."

• "Landis Tool Co. of Waynesboro, Pa., has just issued an ex-

tremely interesting catalog on the construction and use of grinding machines. In the introduction, it is stated that while the lathe cannot be employed for producing accurate work, even of soft materials, it fails utterly when applied to hard stock. Their grinding machines are designed to fill this deficiency."

• "The Welsh Tin Plate Workman's Union recently held a meeting during which the chairman stated that the union was 'defeated, demoralized and discouraged.' The break up of the Welsh monopoly of the world's tinplate trade has virtually broken up the union and many workers leave for the United States each week."

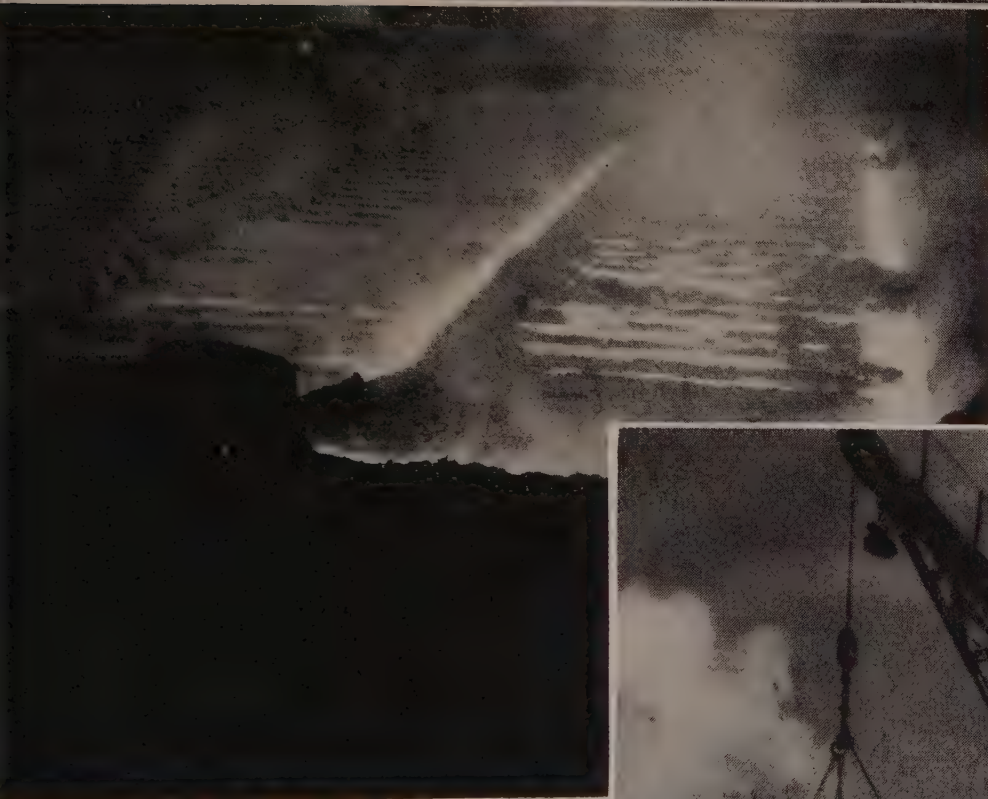
• "A queer item of news has appeared concerning the American Tin Plate Co. of Elwood, Ind. It is stated the company is doubling the size of their plant, 'making it a 40-mill concern,' that steel billets are to be made for rolling into tinplate bars, and in addition to all this the company will manufacture bicycles. We are assured on good authority that this news is entirely false."

Netherlands Blast Furnaces Make Sufficient Pig Iron for A Tidy Export Profit



ABOVE

Blast furnaces at IJmuiden-Velzen near Rotterdam on the North Sea annually spew forth large tonnages of pig iron, one of Netherlands' principal export products. Between 2½ and 4 million Guilders worth of pigs are exported monthly.



ABOVE

urnaces produce pig iron 24 hr a day to supply home and export markets. Here is shown the primitive method of using runners to direct the flow of metal to sand molds set up on the ground.

o o o

RIGHT

part of the pipe and tubing manufactured at IJmuiden-Velzen is used for domestic building purposes. The balance is earmarked for export. Here workers are shown picking pipe from the mills for future shipment.



Weekly Gallup Polls . . .

Atomic Energy Blessing or Curse Polled Here and Abroad

Poll To Be Examined

New York

• • • For the past several years THE IRON AGE has had the exclusive rights in its field to run the Gallup Poll. This was done as a service to the metalworking industry.

As a result of the outcome of the presidential election, a conference has been arranged at Princeton, N. J., next week at which a searching and critical analysis of machinery and techniques used by the poll will be made.

THE IRON AGE will continue to provide this service pending the outcome of the investigation.

Princeton, N. J.

• • • People in foreign countries seem much less optimistic about the benefits of atomic energy than Americans are, according to George Gallup, director, American Institute of Public Opinion.

In England, Sweden, Holland and Australia the weight of opinion is that it will prove more of a curse than a blessing in the long run. In

the United States, by contrast, the main feeling is that atomic energy will bring benefit rather than harm.

Surveys were conducted simultaneously in the four countries in late October on the question:

"Do you think that, in the long run, atomic energy will do more good than harm?"

The questioning was done among voters by interviewers for the Gallup Poll affiliates and the results follow:

	More Good Pct	More Harm Pct	No Opin. Pct
Holland	25	52	23
Sweden	26	48	26
England	33	41	26
Australia	36	46	18
U. S. A.	42	23	35

The American results in the survey indicate considerable faith in the possibility of good in the atom, whereas the people interviewed in Holland seem to have the least confidence in any benefits from atomic fission. Americans probably derive comfort from the fact that the United States has a long lead in

Views in Foreign Countries Differ Sharply from U. S. Where People See Benefits

o o o

atomic research, whereas the other countries probably fear that their own first taste of atomic energy might be in the form of bombs if there is another war.

A significant finding in the American survey is that the most educated groups have greater confidence in atomic energy than the less well educated.

A substantial majority of those who have had some college education think the atom will prove beneficial, particularly in science and in industry. The vote follows:

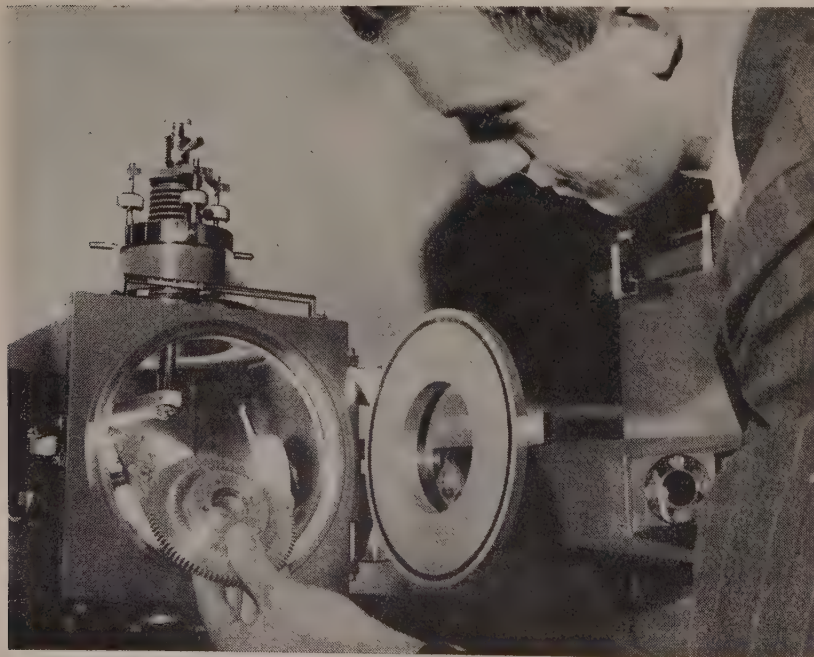
	Good Pct	Harm Pct	No Opin. Pct
College	61	18	21
High School	47	25	28
Grade or no School	31	23	46

However, an increasing number of people in recent years have come to the conclusion that the use of atomic energy in bombs is a bad thing.

In September, 1945, one month after first use of the bomb on Japan, 69 pct questioned said they thought the development of the bomb was a good thing, because it hastened the end of the war. But two years later, in October, 1947, only 55 pct continued to say it was a good thing, while 38 pct expressed the opinion that it was bad and 7 pct had no opinion.

Thus far atomic energy has proved useful in medicine in treating a number of diseases. Radioactive isotopes from the atomic plant at Oak Ridge, Tenn., are flown to a number of hospitals for use in treating certain types of goiter. While experts predict that eventually atomic energy may be a major source of power for industry, its industrial uses are limited at present.

RUST PROBER: Dr. J. G. Hutton, a GE engineer, inserts a sample in an electric diffraction instrument to study the corrosion and crystalline structure of a layer of metal less than a quarter-millionth of an in. thick. Dr. Hutton headed the development work on this instrument for GE.



Crucible Steel Starts New Coke Development

Midland, Pa.

• • A new battery of 63 coke ovens was put into operation here last week at the Midland Works of Crucible Steel Co. of America. The new ovens and added facilities for coke byproducts represent expenditures of some \$6 million for fuel development alone in the big basic steel production center of the company.

With 184 coke ovens in operation, including the new battery, the output of coke at Midland Works will be brought to approximately 1800 tons per day, an increase of one third, according to William P. Snyder, Jr., board chairman, who headed the group of company officials and other industry representatives visiting the plant.

Coke oven gas from the new battery will go into the Midland gas system, providing substantial supplies of this vitally needed fuel for steelmaking processes. This consideration is especially important, it was pointed out, in times when outside sources of gas are severely taxed or even inadequate, as in past winters. The daily fuel requirements are equivalent to approximately 25 million cu ft of natural gas. The Midland Works now can produce about 53 pct of their needed fuel.

The greater part of Crucible Steel's openhearth and electric furnace production is being centralized at Midland. Present plans call for an average ingot production of some 95,000 tons per month, compared with a monthly output at the level of about 65,000 tons per month in the early 1940's. Expanded finishing facilities at Midland, especially for flat rolling of stainless, alloy and high-carbon steels for myriad industrial uses, require a good part of this ingot production. Also, semifinished steel from Midland is shipped for further special processing to Crucible plants.

As a whole, the Crucible Co. plants and warehouse system now are completing a \$30 million program of plant improvements started in 1946.

The 63 new coke ovens were engineered and built by the Engineering & Construction Div., Koppers Co., Inc. The ovens use the

600 POUND STAINLESS STEEL CASTING



Pump Housing Produced For Nationally Known Pump Manufacturer

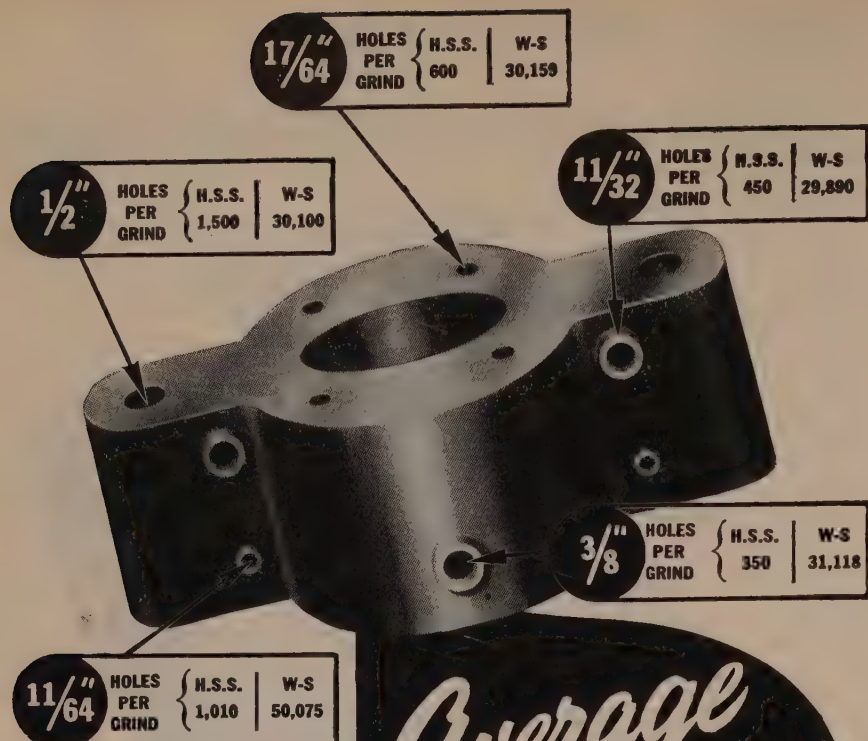
Whether you require stainless steel castings of a few pounds or many hundreds, MICHIANA can produce them to exactly meet your particular requirements.

MICHIANA No. 49 is widely used for products where sanitation and beauty are important as for food processing machinery. It has good machineability and retains a beautiful clean finish. No. 100 alloy, with a different chromium-nickel content, and variations of this alloy find wide use in many industries such as chemical, rubber, sulphite paper mills, etc. and for pumps, fans, screw conveyors and similar equipment used in industries where corrosive action must be resisted. Assistance in determining appropriate alloys is yours for the asking. We invite your inquiry. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.



Booklet 111
mailed on request.

MICHIANA
STAINLESS STEEL
CASTINGS



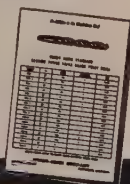
Average
**34,268 HOLES
 PER GRIND**

with

**WENDT-SONIS
 CARBIDE TIPPED
 TWIST DRILLS**

Records of drill performance kept by a large manufacturer producing cast iron parts, show how W-S Carbide Tipped Twist Drills average 43 times more holes between grinds. Comparisons were made on drilling operations in cast iron. Parts were drilled on multiple-spindle automatic machines. For faster, cleaner lower-cost drilling, try Wendt-Sonis Carbide Tipped Twist Drills in your work. These tools are recommended for drilling plastic and other non-metallic materials as well as non-ferrous metals. Get details in connection with your job requirements.

FREE Write today for catalog containing details and latest prices. WENDT-SONIS COMPANY, Hannibal, Missouri; 580 Prairie Ave., Hawthorne, Calif.; 1361 W. Lake St., Chicago, Ill. Warehousing Facilities: Eastern Carbide Corp., 909 Main St., New Rochelle, N. Y.



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 DRILLS • END MILLS • FLY CUTTERS • TOOL BITS • MILLING CUTTERS • REAMERS
 ROLLER TURNING TOOLS • SPECIAL BITS

100 pct high volatile coal produced by the Crucible mine at Crucible, Pa.

The new battery will be underfired with blast furnace gas from the Midland Works, conserving the higher grade coke oven gas for steel process uses. A 1 million cu ft gas holder for storing blast furnace gas is in service. New Koppers-Elex electrostatic precipitators have been installed, one to clean blast furnace gas to underfire the new coke ovens, and the other to remove tar from coke oven gas.

Extensive new byproduct facilities are being installed at Midland. Koppers auxiliary equipment for the coke operations—primary coolers, flushing liquor equipment, exhausters, detarring apparatus and driers—provide capacity to handle over 2700 tons of gas, ammonia still, acid separator, coal per day.

**Package Box Car Trend
 Gains Momentum Rapidly**

Chicago

• • • Since the introduction of the standardized all welded package box car, the PS-1 made by Pullman-Standard Car Mfg. Co., 40 pct of all box cars ordered from contract builders have been for this type.

The standardized box car built by Pullman is made from component parts engineered mainly and manufactured in their own shops. Standardization has made it possible for the company to extend their application of mass production techniques both in fabrication and assembly.

Wallace N. Barker, executive vice president, attributed the company's increase in the building of freight cars this year to the long production run which can be accomplished, given adequate orders in a commercial car shop on a standardized product.

Pullman delivered 21,464 freight cars to the nation's railroads during the first 9 months of 1948. This exceeded by 5023 the number of cars delivered in the entire year of 1947, and was greater than a full year since 1930, with one exception. Of the number of cars delivered by Pullman-Standard 3 freight car plants during the first 9 months, 12,560 cars were the PS-1 type.

CUT Plant Rearrangement Costs

with SQUARE D's PLUG-IN DUCT

duction capability of the modern plant directly related to arrangement of machinery and equipment. Rearrangement may be necessary to take full advantage of improved process or to permit economical manufacture of a new product.

PLUG-IN DUCT can be installed with a minimum of delay and expense near ceilings, along walls, or directly above machinery to provide power where it is needed. It replaces the more conventional panelboards, which have conduit-enclosed conductors, typical of less modern installations.

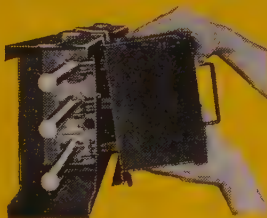
Write for Bulletin 5600. Address Square D Company, 6060 Rivard Street, Detroit 11, Mich. call your nearby Square D Field Engineer help in laying out your duct system.

GET THESE FEATURES

Round Copper Bus Bars provide greater mechanical strength and resistance to short-circuit stresses. Supports are non-carbonizing porcelain.



Plug-in Units of either circuit breaker or fusible switch types are easily installed at 2-foot intervals along both sides of the duct. Plug-in stabs grip the round bus bars with exceptionally high pressure. A hook-type bracket permits rotation of the unit into place. A single clamp screw at bottom holds it there.



Hanger Brackets of heavy gauge steel are two-piece construction to facilitate assembly around duct enclosure. They are suitable for either edgewise or flat mounting of duct structure.



Flexible Connectors of laminated copper join bus bars between sections to provide for expansion and contraction, permit proper alignment and insure tight joints. All bolt heads face outward.



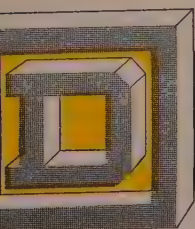
SQUARE D COMPANY

DETROIT

MILWAUKEE

LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.



THE NATION STANDS a good chance of slipping on a living room rug and falling flat on its face, if a safety survey of a half-million school children is any indication.

Conducted by the Greater New York Safety Council, the survey gave the youngsters a series of safety situations to check—to see if they were followed in individual homes. Number one hazard, among those listed, was small rugs on slippery floors, not tacked down and not made skidproof.

Last year the survey—one of the largest conducted in the country—showed that the most common cause of injury was improper placement of malleable materials, line, kerosene and

Second most common were the children's safety doors and burglar alarms, immediately after the surprising number of injuries, the safety

In third place were malleable liquids, and in the fourth, the use of sturdy bases on when reaching

Families were warned in leaving small children

The children's windows were found to be a hazard, could fall out of the window, reported a bump in electric cords and starters.

Explosion Down Base

A heater in the basement of Mrs. Reo F. out of her chair on the first floor of the house. A physical therapist and she

The oil heater blast knocked between the base and tore the hinges. The kitchen was ripped loose.

The dining room knocking over were called, but flames.

Jap Croc First Tin

Ship manifests Maritime Exchange the arrival here were for the war.

The Norwegians brought 30 cases as well as 32 cases necklaces.

The British brought 4,500 cases of sheet rubber from Batavia, Netherlands East Indies.

EXPENDITURES for maintenance and repair of existing buildings are expected to total about \$6 billion in 1948, about the same figure as in 1947, according to a forecast prepared by the economists of Producers' Council, David S. Miller, Council president, stated today. The Producers' Council, Inc., is a national organization of manufacturers of building materials and equipment.

"With repair work included, the total volume of all building next year, including new construction, is expected to approximate \$20 billion," Dr. Miller said.

Zorball cleans up local trouble spots

There's one safe, certain answer to the dangerous grease and oil spots you find around machines and on plant floors. It's **Wyandotte Zorball**, the all-purpose floor absorbent.

Zorball is easy and economical to use. A thin layer of this granular product absorbs oil, grease, water, paints and other liquids quickly and completely. It provides an immediate anti-slip surface underfoot.

Even when saturated, **Zorball** retains its original form. There's no caking, packing nor forming of "mud" to be tracked around the shop. It will not injure fabrics, wood, metals, rubber, or the skin of those who handle it.

Furthermore—and this is important—**Zorball** helps prevent fire hazards. It is chemically inert and nonflammable... resists combustion even when oil-soaked.

Wyandotte Zorball is listed by Underwriters' Laboratories.

Ask your nearest Wyandotte Representative for complete information on **Zorball**. All you have to do is give him a call.



Trouble afoot?
Why not try
**WYANDOTTE
ZORBALL**



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WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

The cost of 1000 gallon and used and said. The has been the use of cubic feet kitchen range. The cost of the U. S. 1 tankers to oil here was bought in company being produced Coast.

City located at a company of 500, plant. The move

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Research Man Explains Methods of Measuring Torsional Vibrations

East Lansing, Mich.

... Methods of measuring torsional vibration were explained recently by Lawrence F. Hope, General Motors research laboratories at a Michigan State College meeting of the American Society of Mechanical Engineers.

In the past, Hope said, "torsional vibration has sometimes been considered a concern of the 'long-hairs,' with no place in the automotive industry. It was known that marine and aircraft engines sometimes broke crankshafts because of torsional vibration. But it was rare for breakage to occur in automobiles."

This was because passenger car engines were restricted to a small number of stereotyped designs with conservative loading of crankshafts, and when vibrational noise developed at a certain speed in an automobile it could be minimized with dampers or harmonic balancers that counteracted it.

"In the truck and bus field, however, engines were operated at higher load factors and were expected to last much longer. When diesel engines, with their greater peak pressures and torque fluctuations, entered the field, crankshaft breakage became an ever present possibility to be guarded against by careful design and development work," he said.

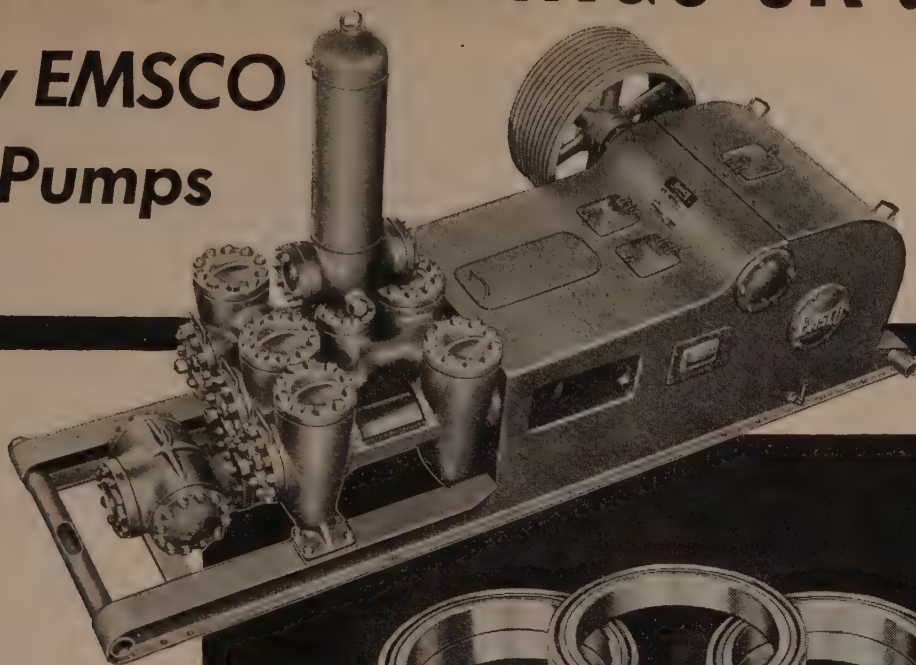
More attention is given to the problem now, the GM Research staff member declared, because truck engines and diesels are used for more special and specific jobs in which traditional designs won't work.

He described various types of torsionographs which engineers use to measure the vibrations, including a phase shift torsionograph developed by GM Research, together with various types of calibrated

These instruments are used not only in the automotive field but also in aircraft, marine and stationary engine work, such as pumping stations, earth-moving machines and engine generator sets. These range from lightweight power plants that a man can hold in his hands to diesel locomotive engines and generators.

KAYDON BEARINGS OK'd

For New EMSCO
Triplex Pumps



KAYDON Radial Roller Bearings, 14.000" x 18.000" x 2.500" are used in the gear reduction unit of the new Model A-10 EMSCO Triplex Pump, a powerful slush pump made by Emsco Derrick & Equipment Co., Los Angeles, California; Houston and Dallas, Texas.



Field operators know EMSCO Slush Pumps for their engineering design, that results in big savings in weight, higher horsepower capacity per unit of weight, greater strength, and dependable performance.

KAYDON Bearings, precision-built and rugged, fit right into the sound engineering policies that have made modern EMSCO machinery so successful.

Similarly, in other fields of heavy-duty machinery, KAYDON Bearings are helping designers add outstanding

advantages. Huge precision grinders, steel mill equipment, paper mill machinery, road-building units, excavators, hoists, crushers, bending machines and other heavy-duty equipment are serving industry better because of KAYDON Bearings.

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Capacity now available for all types and sizes of KAYDON Bearings . . . standard or special. A confidential discussion of your problems may point the way to opportunities through use of KAYDON Bearings.

KAYDON Types of Standard or Special Bearings:

Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

"Miss Great Lakes" Gold Cup winner for '48

Depended on Wheelock, Lovejoy Alloy Steel



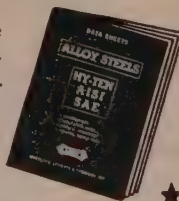
Photo Courtesy The Detroit News

UNUSUALLY ROUGH RACING CONDITIONS DISABLED 12 OUT OF 14 BOATS

Properly selected alloy steel, from which vital equipment was fabricated, played a leading role in winning the grueling 1948 Gold Cup race that saw only 2 of 14 starters cross the finish line. The winner, "MISS GREAT LAKES", driven by Danny Foster and owned by Al Fallon, had underwater struts, rudder, jack shaft and steering pitman arm made from Wheelock, Lovejoy HY-TEN B #3X steel. This particular alloy was selected and properly heat treated to meet the most rugged conditions possible. The fact that not one of these parts failed or even bent, in spite of the terrific beating they took, is ample proof of HY-TEN's superior physicals. And it's proof too that Wheelock, Lovejoy knows steel. Perhaps you have a tough job that demands just the right steel—write Wheelock, Lovejoy today.

WL steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability—thus eliminating costly changes in heat treating specifications.

Write today for your **FREE COPY** of the Wheelock, Lovejoy Data Book. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.



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LOVEJOY & CO.,
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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

NEWS OF INDUSTRY

Increases Production Through Conversion

Cleveland

• • • Production of the Warren Ohio, blast furnace of Republic Steel Corp. is expected to be increased from 1275 tons per day to 1500 tons per day as result of the conversion of the furnace "high top pressure" blowing. The furnace is back in production after a 10-day changeover shutdown.

During the shutdown period a number of changes in the furnace top were made to permit a tight seal between the bell and hopper through which the iron ore, coke and limestone are charged into the furnace. In addition a new turbo blower to provide air for the furnace has been installed. The blower, the largest blast furnace blowing engine ever constructed can provide 125,000 cu ft of air per minute at pressures up to 40 lb psi.

Republic is now using pressure blowing technique in blast furnaces in Cleveland, Chicago and Youngstown, and will use it very shortly on a furnace at Buffalo. Experience to date shows that output of furnaces using this technique can be increased by 20 per cent or more if sufficient blowing capacity is present.

The Warren furnace was built in 1919 and completely rebuilt and enlarged in 1929 and 1939. It was last relined in 1945. The volume of the interior of the furnace is 45,460 cu ft. At one time it was regarded as structurally the largest furnace in the world, but since has been exceeded by two or three more recently constructed blast furnaces.

War Dept. Honors Davey

Kent, Ohio

• • • Paul H. Davey, president of Davey Compressor Co., was honored Oct. 15 by presentation of a War Dept.-Navy Dept. Certificate of Appreciation in recognition of his services to the Office of Scientific Research and Development. In making the award before an audience of 200 Davey plant employees, Lieut. Col. Anthony Fleming, U. S. Army Engineers, paid tribute to the Davey company's war production record.

AUTOMATICALLY FROM COIL

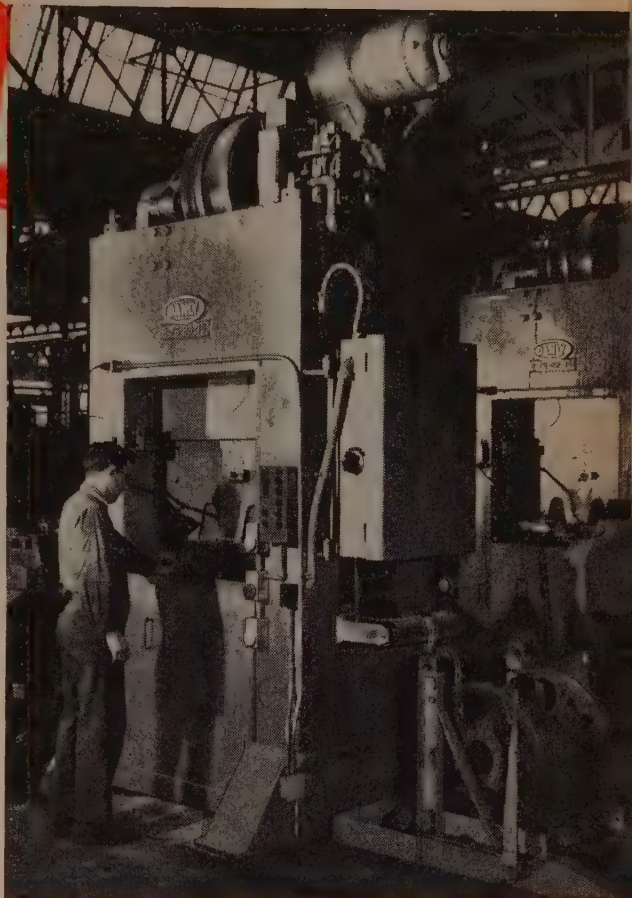
EQUIPPED WITH AUTOMATIC COIL FEED AND CHAIN SPOOL

Danly Chain Belt Co. continuous steel detachable chain is manufactured complete on each of these Danly presses at the rate of a link per stroke. Operations consist of blanking, piercing, forming, and assembling the chain from steel coil stock which is fed automatically.

PRESSES GIVE LONG TROUBLE-FREE SERVICE

The resulting low manufacturing cost of this high speed operation is not the only economy effected. Extra savings accrue because the presses are designed to stay on the job longer, eliminating expensive down-time. For example, the frames of Danly presses are extra-heavy, welded steel construction, which are fully stress-relieved before machining. This assures continued alignment and a minimum of bed deflection—no more than .0006" per foot of bolster width. In turn, accuracy of die alignment is maintained which gives more stampings per die grind and longer die life.

Further, long trouble-free operation is assured by the Danly automatic filtered oiling system. Clean, filtered oil is piped directly to each gear, bearing, and driving member—including the flywheel bearings.



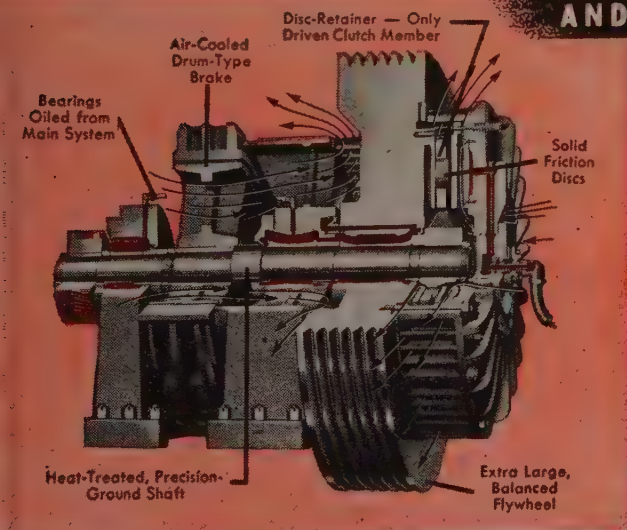
DANLY VENTILATED CLUTCH CUTS DOWN-TIME AND PRESS MAINTENANCE COSTS

The new Danly Ventilated Clutch is another exclusive feature that offers unusual advantages in reducing press down-time and maintenance costs. High velocity air ventilation eliminates over-heating. The drive shaft, gears and bearings are fully lubricated automatically. *Test runs under full load show negligible disc wear after more than 8-million successive clutch engagements.*

WRITE FOR MORE FACTS

Write today for more facts on the time-saving features of Danly Presses. Find out how Danly Presses can help you cut stamping costs. Ask for a complete presentation and a production estimate.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS



25 YEARS OF DEPENDABLE SERVICE
TO THE STAMPING INDUSTRY

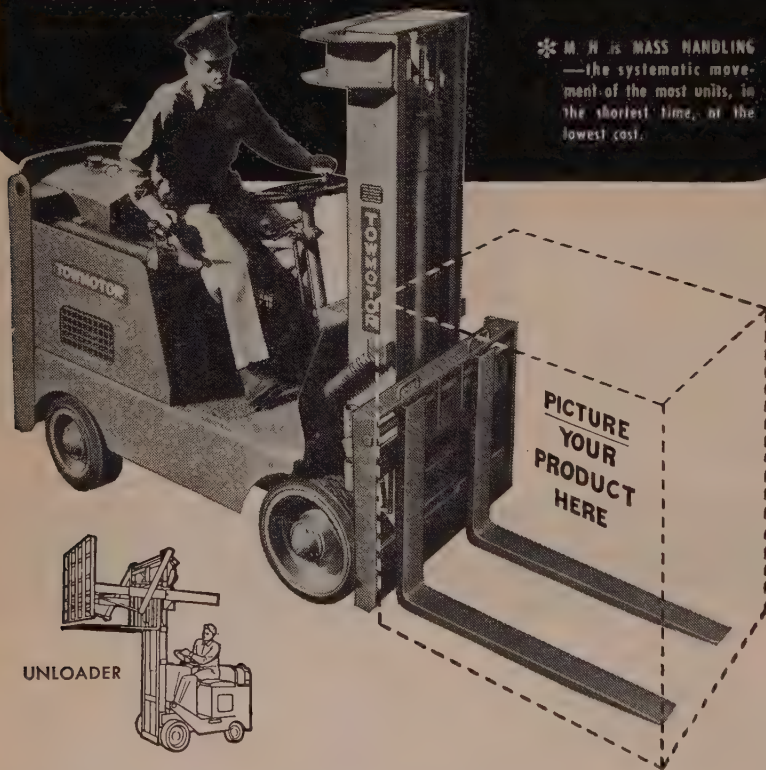
Is Your Product Priced to Sell?

Slash Production Costs
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Declares Thoroughly Annealed Tubing Will Decrease Corrosion

Tulsa

••• Corrosion that haunts oil wells can be greatly reduced by using more thoroughly annealed steel for tubing and casing, Dr. P. H. Cardwell of Dowell Inc., Tulsa, told a statewide meeting of the American Chemical Society recently.

Since oil wells are being drilled deeper and deeper and are encountering more and more corrosive fluid, it becomes a requirement to obtain as corrosion-resistant metal as possible, Dr. Cardwell said. One way to accomplish this is to have completely annealed metal.

Reporting research on 17 different steels, he stated that the extent of annealing varied over a wide range. Annealing, it was explained, is a process involving heating steel to a critical temperature, which induces the tiny crystals to rearrange themselves and form a tougher structure. It has always been assumed that as long as a piece of steel is annealed, the metal will be at its state of lowest corrodibility.

Dr. Cardwell's studies indicate, however, that longer annealing periods help to make steel more resistant to ordinary rusting and to corrosion caused by the hydrochloric acid employed to "cut" rock barriers in drilling oil wells.

"Thus, no longer should we ask, is steel annealed, but we should ask how complete is the annealing," he said.

An excellent indication of the thoroughness of annealing can be obtained by examining the metal under a microscope, he continued.

Under low magnification, black spots are visible which are clumps of an iron-carbon material called pearlite. As the magnification is increased, the spots are resolved into black parallel lines.

"It was found that a steel in which the pearlite was resolved at a magnification of 1000 diameters had a higher corrosion rate than a steel in which the pearlite was resolved at a magnification of 500 diameters," he reported.

"The greater the magnification required to resolve the pearlite of

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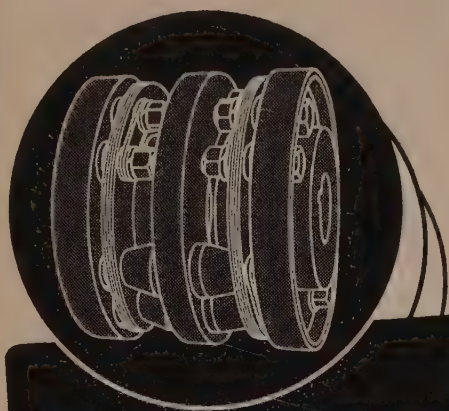
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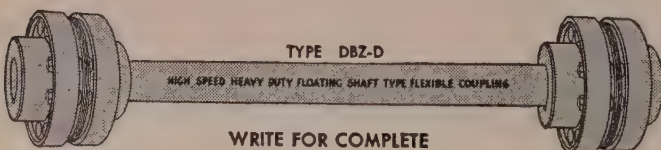
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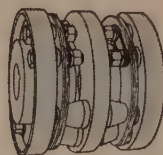
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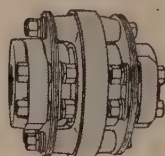
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does not depend on springs, gears,
rubber or grids to drive. All power
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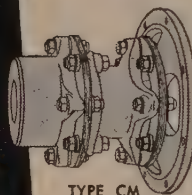
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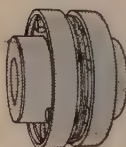
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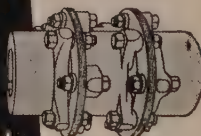
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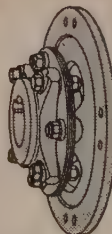
TYPE CM



TYPE ST



TYPE AM



TYPE SS

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NEWS OF INDUSTRY

a steel, the more susceptible is that steel to corrosion in inhibited hydrochloric acid solutions. The same probably holds true for other corrosive media.

"The formation of pearlite can be controlled by annealing. The more complete the annealing, the lower is the magnification required to resolve the pearlite, and likewise the lower the corrodibility of the steel."

Publishes Wage Rates For 52 Local Regions

Cleveland

... Gray Iron Founders' Society, Inc. has released to members of the industry a 95-p. report on prevailing wage rates in the gray iron foundry industry.

The report includes summaries of wage rates, both average straight time and incentive earnings rates, for 52 local regions throughout the United States.

Average hourly earnings, compiled from information received from more than 500 gray iron foundries are shown for 51 selected occupations in the industry.

The report also gives data on operations and hours of work. Copies of the report are available for purchase by gray iron foundries—price \$15 per copy, postage prepaid.

Nail Output Increases

Toronto

... Canadian production of wire nails in August amounted to 7662 tons compared with 6482 tons in July and 5789 tons in August, 1947. For the first 8 months this year production totalled 55,497 tons compared with 49,780 tons for the like period last year.

Production of steel wire in August amounted to 22,875 tons against 22,738 tons in August last year and brought total for the 8 months this year to 209,056 tons against 205,369 tons in the 1947 period.

Production of steel wire fencing in August amounted to 1136 tons compared with 1648 tons in July and 1551 tons in August last year. Production for the first 8 months this year totalled 16,683 tons against 17,393 tons in the 1947 period.

Engineers Study Means To Improve Quality Of Product and Cut Costs

Schenectady

• • • Ways in which electric heat can be extended throughout industry to cut production costs and improve product quality were studied by 175 electric utility engineers who recently attended a General Electric industrial heating course at the Adirondack Inn, Sacandaga, N. Y.

The electric heating methods included those already in use in the manufacture of many products ranging from automobiles and farm implements to cigarette lighters and compacts. Case studies in which different types of electric heating equipment have cut production costs of some parts to a fraction of their original costs were presented by engineers.

All types of industrial heating equipment from midget soldering irons to huge foundry furnaces were studied.

In one of the papers presented scores of examples of savings through the use of electronic heating were described by K. E. Kjolseth of the industrial heating div.

H. M. Webber, also of the industrial heating div., told the group that electric furnace brazing, another widely-used type of industrial heating, has made it possible to simplify product design, save material, and lower production costs.

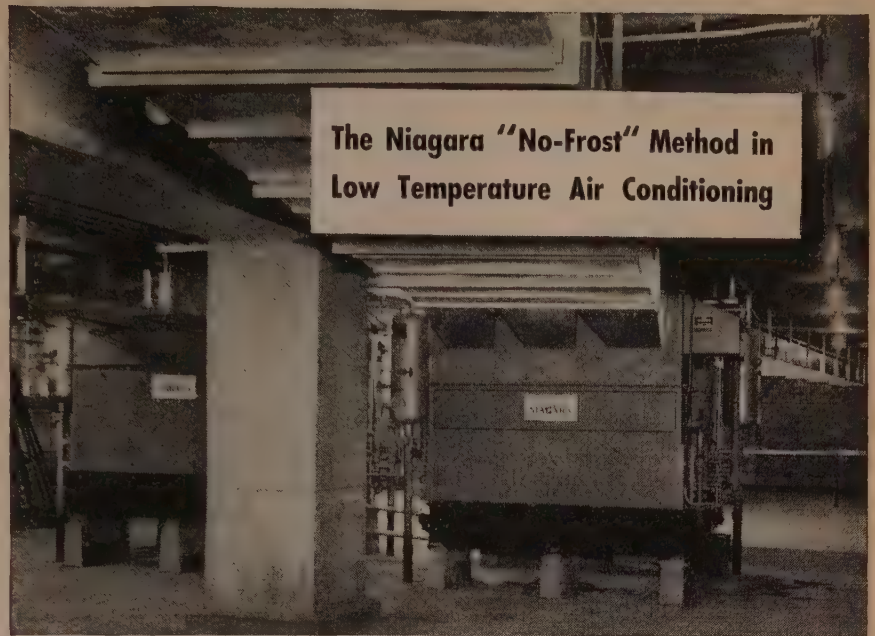
"Many parts formerly cast, forged, or machined from bar stock have been redesigned and are now made from inexpensive stampings, tubing, and screw machine parts," he said.

Electric furnace brazing is used widely in the manufacture of parts for business machines, sewing machines, refrigerators, automobiles, tractors, and airplanes, according to Webber.

Discussing electric furnaces for foundries, R. M. Cherry, manager of sales, said that 70 electric annealing furnaces are now in operation in this country. Six foundries are now completely electrified, he said, but less than 20 pct of the total production of malleable iron is electrically annealed.

Cherry said that manufacturers of automobiles and trucks use 45 pct of the nation's production of malleable iron castings.

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The Niagara Type "A" Air Conditioner creates any condition of temperature and humidity for a test or process, and if wanted, creates different conditions in different rooms simultaneously.

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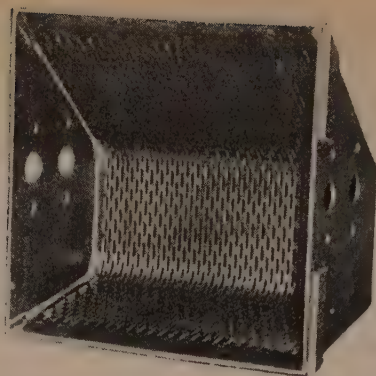
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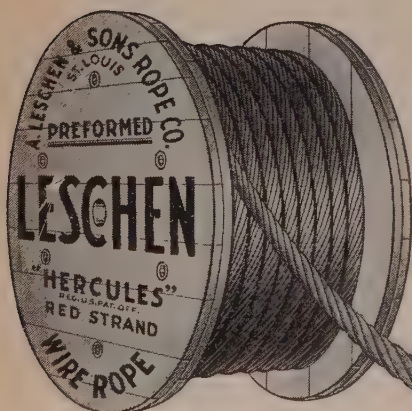
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PEI Group Develops Ways to Cut Damage To Goods in Transit

Washington

• • • Testing equipment and test procedures have been developed for pre-proving the ability of porcelain enamel packaged products to travel to their destinations undamaged, according to Ralph F. Bisbee, of the Porcelain Enamel Institute.

Further success in the institute's program to defeat product shipping and handling damage is seen in the recent endorsement by three major carriers' groups of both the testing equipment selected and the severity and duration of the tests. Such approval has opened the way to standards for packaged product testing which will have the mutual acceptance of the manufacturers of porcelain enameled products and the carriers.

Agreement was also reached with the carriers' representatives to inaugurate educational programs within their own memberships to parallel PEI packaging and shipping committee efforts, and to make all possible improvements in handling conditions and facilities. Mr. Bisbee is committee chairman.

The testing equipment recommended by the technical planning division of the PEI committee for consideration by the carriers' representatives included: a shock recording instrument which can be attached to the packaged product under test and which will automatically record the longitudinal impact and vertical vibration created by the test; an impact testing device which can produce a variable degree of longitudinal impact or shock; and a vibration tester which can produce a variable degree of vertical movement and reach stages of harmonic vibration.

This combination of test equipment with suggested minimums of severity and duration were presented and demonstrated before A. L. Green of the Assn. of American Railroads, A. E. Dowling of Railway Express Agency, Inc., and W. L. Yingling of American Trucking Assn.

All three carriers' groups gave full endorsement of the testing equipment and agreement was reached on the severity and time constants required. The impact tester, which consists of a railed surface inclined

about a 60 degree angle and a neeled dolly upon which the packed product rides to an abrupt stop against a solid bumper, will operated from the fifth zone on the inclined plane. This was agreed sufficiently severe to approximate not only transit hazards but also the loading and unloading abuse which must be considered.

The vertical vibration test was agreed to satisfactorily simulate average transit vibration if operated at a frequency rate of 1 g (unit of measurement which defines both length and frequency of vibration) for a duration of 1 hr. The two-way shock recorder was approved as a suitable instrument to record test intensity.

E. H. Shands of Geo. D. Roper Corp., and chairman of the technical planning division of the PEI committee, made it plain that the purposes of the current program were not to select or proclaim the merits of any particular package or packing method but to provide manufacturers of porcelain enameled products with a means of determining whether the packaged product could be expected to arrive at its destination undamaged. The design of the package and product and packaging method will be the concern of the individual manufacturer, according to Mr. Shands.

It is anticipated, according to committee spokesmen, that each manufacturer will invest in his own testing equipment since total cost estimated at not over \$2,000—sum which could be saved within a few months when product losses are reduced. No particular brand of equipment will be specified providing the equipment purchased will conform according to the standards which will finally be agreed upon by those concerned.

receives Safety Awards

Youngstown

• • A trophy and two certificates of achievement were awarded to the Youngstown Sheet and Tube Co. recently at the National Safety Congress in Chicago for safety records last year.

Hubbard, Ohio, works received a trophy for operating more than a year without a disabling injury. All plants in the steel plants' Group C division.



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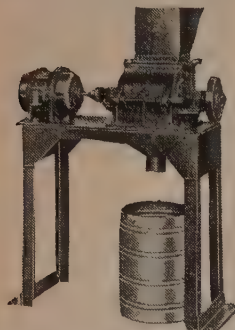
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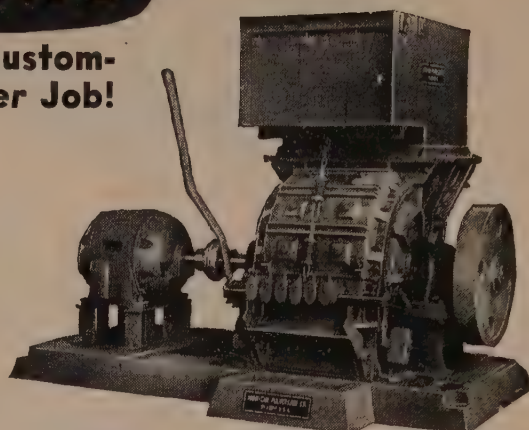


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To Buy \$5 Million Of WAA Equipment

Cleveland

• • • Jack & Heintz Precision Industries, Inc., has completed arrangements with War Assets Administration for the purchase of machinery and equipment, having an original cost of more than \$5 million, according to a company announcement.

This equipment formerly under lease is required for the manufacturing plans and programs now under way in the company.

The company also announced that it has started negotiations with WAA to purchase buildings 3 and 4, part of its Bedford plants, which are now held under lease. Accelerated activity in aviation products related to the company, together with other commercial product lines now being manufactured, plus those under development, have made necessary certain rearrangements in the plant and manufacturing structure of the company.

As part of its overall program Jack & Heintz also announced it has decided to sell their Berea Road plant for the purpose of consolidating its manufacturing facilities into a more concentrated structure. This plant had been acquired by the predecessor company, Jack & Heintz, Inc., and is located about 15 miles from its main plants.

A company spokesman stated: "Should this plant be sold, manufacturing operations presently conducted in it will be moved to one of our other plant locations."

BLS Reports Fewer Strikes

Washington

• • • Strikes during the first months of 1948 totaled 2380 and involved 1,690,000 workers, the Bureau of Labor Statistics reports. More than 28 million days of production was lost.

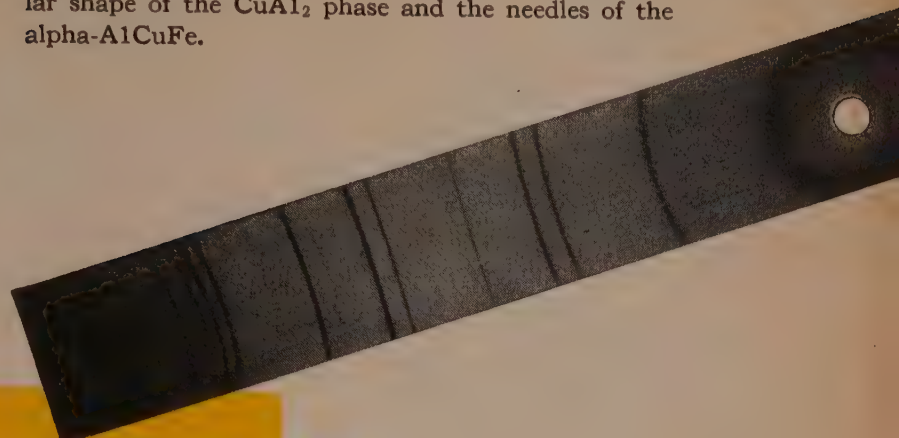
However, this was 800 less strikes and three million fewer work days lost than for the same period last year.

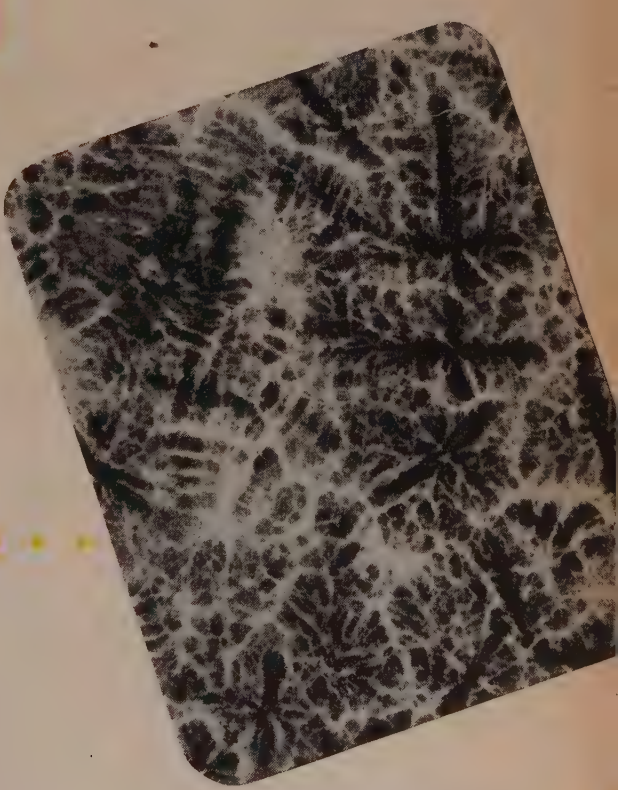
September labor disputes dropped to 250 from the August figure of 335. However, because of such work stoppages as the West Coast maritime and refinery strikes, the number of work days lost in September rose 650,000 over the August figure to a total of 2.4 million.

- 
- 1. Photomicrography** to study structures directly . . . With microscope and camera, this technic produces a direct, highly detailed study of a material, such as this photomicrograph (at 500X) of an aluminum casting containing 8% copper. It can show factors that will influence machinability, as pictured here in the globular shape of the CuAl_2 phase and the needles of the $\alpha\text{-AlCuFe}$.

3 ways photography shows STRUCTURES of materials . . .

- 3. Microradiography** to show composition in depth rather than on a single plane . . . With fine grain emulsions, low-voltage x-rays, and microscope, this technic produced this 35X-magnified x-ray study of the same aluminum alloy. It can show the factors influencing pressure tightness, by depicting how evenly the phases are distributed and indicating whether voids are present.

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- 2. X-Ray diffraction** to determine the relative position of atoms in metals . . . With x-rays and a diffraction camera, this technic produced the above record to identify the components of the same aluminum alloy and measure their proportions. It can show the factors influencing fatigue, strength, or thermal behavior in a material.



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Government Buildings To Use More Steel Fittings

Washington

• Looking to more economic maintenance costs, more light hollow metal doors, more general use of metal trim for doors and windows, and wider use of piping for expansion of radiant heating is in the cards for the federal buildings tomorrow.

This has been indicated in recent informal talks by General Philip B. Fleming, Federal Works Administrator, and Building Commissioner W. E. Reynolds. They are working toward simpler and more standardized designs for public buildings as well as more economy in both construction and upkeep.

Results of the program will become evident first in construction of new post offices. Past custom has been to use heavy wooden doors equipped with plates and hinges but continuous repair and replacement have been necessary.

For some time, it is revealed, government architects have been experimenting with light, hollow metal doors. When the standardization program begins, the government plans to buy these in quantity.

Another innovation will be widespread installation of piping for radiant heating of ramps to remove snow and ice, to reduce winter hazards.

On the other hand, tile and steel wainscoting in mail and shipping rooms is likely to be replaced with hard-pressed fiberboard, with a try-out of plastic materials, reinforced and protected at corners with steel angles.

Vultee on Navy Contracts

San Diego

• • • Consolidated Vultee Aircraft Corp. which now is concentrating almost solely on Navy contracts, has disclosed first details of the XP5Y-1, which is expected to bring flying boats back into the modern aviation picture.

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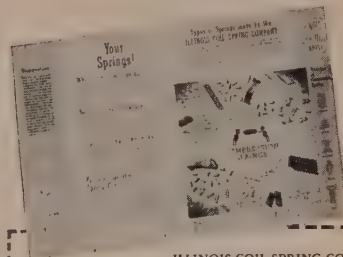
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NEWS OF INDUSTRY

Willys' Head Sees New
 Trend In Auto Design

Toledo

• • • Delmar G. "Barney" Roos, vice-president of Willys-Overland, sees an end to the present trend toward bigger and heavier automobiles. Speaking in Pittsburgh recently, Mr. Roos said: "In the face of shortages of steel, oil and rubber, the present trend of the industry is toward longer, wider and heavier vehicles. The only thing certain about the current (styling) situation in the industry," he said, "is that it cannot continue."

Unless automotive manufacturers alter their viewpoint to meet the present situation, Mr. Roos argued, one of three forces will stop the present trend. The first force is taxation; the second is the prospect that prices of steel, rubber, oil and gasoline will sooner or later paralyze the automobile industry. The third factor is the prospect that the cost of buying, operating and maintaining vehicles will reduce purchases to a point where the industry will shrink and many cars will actually be forced off the road, Mr. Roos declared.

Using present day techniques and known factors of design, makers of automobiles can save materials and fuels and at the same time increase mileage per gal from an accepted 15 mile per gal to 30 miles per gal, Mr. Roos declared.

Sets 1949 Sales Goal

Chicago

• • • Hotpoint, Inc. has established a 40 pct increase in dealer sales of major electric appliances for kitchens and home laundries as its sales goal for 1949. The new marketing program for attaining this sales objective will be based on strengthening and refining rather than by further expanding the company's present dealer organization.

Addressing a 2-day conference here attended by 125 distributor principals, Leonard C. Truesdell, vice-president of marketing, emphasized proper understanding of marketing responsibilities, sound dealer structure, and a consistent merchandising activity as the elements upon which Hotpoint will build its 1949 marketing program.

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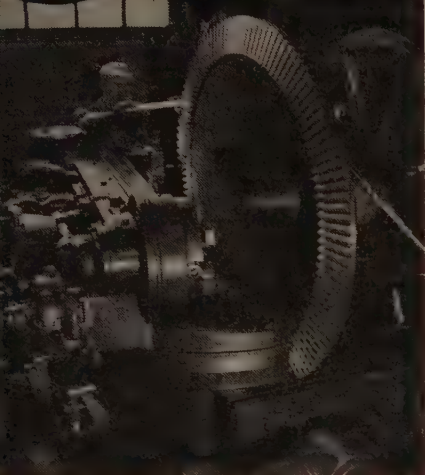
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175	325	700	1300
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Gilmore Steel & Supply Buys Oregon Steel Mills

Portland

• • • Gilmore Steel & Supply Co., San Francisco has purchased the Oregon Steel Mills, Portland, according to A. T. Thies, vice-president and manager for the Gilmore organization, and new manager for the Portland plant.

Arthur Mears, Oregon president, will remain as consultant, Mr. Thies stated, and the newly acquired mill will continue under the name of Oregon Steel Mills without changes in operating policy.

Gilmore now operates a fabricating and distribution plant at Swan Island, and the new plant will serve to augment Gilmore operations on the West Coast. Oregon Steel rolls bars, angles and light structurals, with annual capacity of 60,000 tons of ingots from two electric furnaces. The plant was built in 1942 by the Schnitzer interests and taken over by the Mears and Hall control a year later. Portland is a favorable point for the production of steel scrap and warehouse distribution throughout Oregon and eastern Washington, and its fabricating industries have expanded remarkably in the last decade.

Searchlight, Nev.

• • • Rediscovery of the main lode in a virgin section of the old Duplex mine at Searchlight has been reported by William Roller, president of Metallic Exploration Co. Ore in the vein assays 13 pct lead, 6 pct copper, \$20 in silver and \$3 in gold per ton, according to Mr. Roller, and the company is planning extensive development of the property, with substantial production expected in 1949.

Tube Mills Co. Chalks Up Perfect Safety Mark

Youngstown

• • • The Campbell Tube Mills of Youngstown Sheet & Tube Co. have chalked up a million manhour record without a disabling accident, the 15th time such a record has been made in the Youngstown district since 1935.

106 cost-saving ways to use electronics

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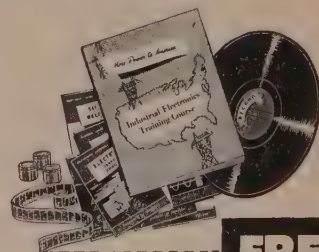
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GENERAL ELECTRIC

Trade Ponders Over Effects of Election Results on Industry

••• Trade sources in the machine tool industry, like many million other Americans, were still picking their way out of the debris of the shattered Republican dream this week and pondering the effect of President Truman's election.

By and large, the reaction of the machine tool trade seemed to be that capital will not be as free as it has been, which is gilding the lily, to say the least.

On the other hand, some observers trying hard to find a ray of light, opined that President Truman will have a Democratic Congress to deal with, which should insure continuity of his program of government spending.

As a coincident parallel to the Democratic triumph, the defense program began to show signs of life. It is evident, however, that certain facets of the defense program will not reach the man on the street except through word of mouth, for reasons of national security. In any event, there is at least one major project for which contracts have been let, which will run close to \$60 million and it seems likely that this is only the beginning.

On an overall basis, the machine tool market continues to be rather quiet. Business is spotty, and while companies here and there are able to report moderate or accelerated sales activity, the trend is down.

The \$60 million in orders under ECA is still in the talk stage, but qualified observers are certain that the business will come through—though very likely not until next year. Waiting for government programs to develop has led people to cutting paper dolls, but government money looms as the industry's biggest jackpot at the moment.

In Detroit, last week's optimism has held over this week as important placements were made in the machine tool market. Further buying for the General Motors Saginaw plant has been reported. This equipment will be used to produce a new automatic transmission for Chev-

Defense Program Begins To See Ray of Light Over First Major Project

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rolet, according to reliable sources.

Reported negotiations between Detroit Gear Div. of Borg-Warner and machine tool sources here have more recently been identified with Studebaker rather than with Ford or Nash as reported earlier. The status of the Ford automatic transmission program remains uncertain at the moment, according to leading suppliers here.

Some substantial buying for Dodge, Lynch Road, has been reported and new quotations have been requested for a GM product improvement and tool room program. A limited amount of Briggs buying has also been revealed. A small but continuing amount of buying for tool and die shops has added a desirable balance to machine tool purchases in Detroit, according to reliable trade sources.

In Philadelphia the trade is concentrating attention on the big Westinghouse program for equipping the old Kansas City plant of Pratt & Whitney for the production of Navy gas turbine engines. The Navy will pay for the plant equipment, but Westinghouse at Philadelphia will do the specifying and ordering. The objective is to draw on the experience of the local Westinghouse gas turbine plant.

According to reliable reports, the operating agreement between the Navy and Westinghouse is about ready for signatures. It is estimated that the volume for the Kansas City plant will exceed \$3 million. In addition, the Navy is buying for its own activities all over the country to replace stock machines sent to Turkey and Greece during the past year. This program is believed to involve \$1 million. Other business is quiet in this market.

In Cleveland, Warner & Swasey Co., one of the bellwethers of the machine tool industry, formally announced a new line of extra heavy duty three-jawed beared scroll chucks especially developed for today's higher rates of metal removal. The chucks are made in two styles, with serrated step-along jaws or with American standard tongue and groove jaws. The chuck body is forged of high carbon steel, the back plate is cast iron, and the scroll is machined of alloy steel hardened to 430 Brinell. Pilot models of the chucks were at the Machine Tool Show.

Warner & Swasey directors declared a dividend Oct. 25 of 25¢ per common share, payable Nov. 24 to shareholders of record at the close of business Nov. 10.

Cleveland Tapping Machine Co., Hartville, Ohio, announced that the following sales representatives were reappointed: Borgan Machinery Co., Inglewood, Cal., for California, Arizona and Nevada; Star Machinery Co., Seattle, Spokane and Portland, for Washington and Oregon; Nolan Co., Chattanooga, Tenn., for Tennessee, Alabama, and Georgia; Frederic & Baker, Shreveport and New Orleans, La., for Louisiana, Mississippi and Arkansas.

Scrap Men Choose Officers

Chicago

••• The Chicago chapter of the Institute of Scrap Iron and Steel, Inc., elected officers for the coming year at a meeting held here Oct. 27.

William Pohn was re-elected president. Other officers re-elected include Barney Silver, third vice president; Henry Rosenthal, treasurer, and Harvey Kaplan, secretary. E. R. Mitchell, who had previously held the post of second vice president, was named first vice president. Frank Grossman previously the first vice president was elected second vice president.

How welding simplifies the design of brackets

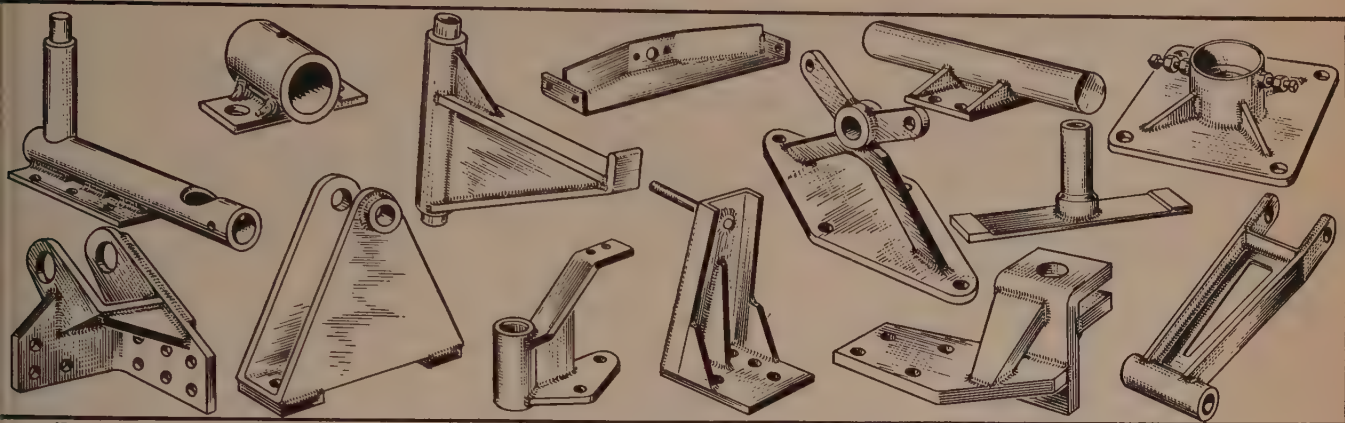


Fig. 1. Typical machinery brackets for various applications built at lower cost with arc welding.

WELDING builds all types of component parts, like the brackets shown in Fig. 1 . . . stronger and with less material. Here are several suggestions for building better brackets at lower cost:

Simplest in design are the brackets shown in Fig. 2, made either from separate members or from a single piece sheared and form-bent. For greater rigidity, the cantilever arm can be built from an "I" section (Fig. 3). Two or more of these "I" sections may be placed side by side and butt welded.

Heavy loads are carried with the

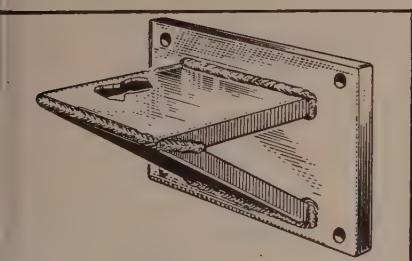


Fig. 4. For heavy loading, the cantilever arms made from channels flame-cut to shape and welded.

More detailed data on the design of brackets for arc welding is contained in the "Procedure Handbook of Arc Welding Design and Practice." Price \$1.50 postpaid in the U. S. A.; elsewhere \$2.00.

channel construction shown in Fig. 4. For rigidity and light-weight construction, steel tubing is form-bent and welded to the supporting member (Fig. 5). With tube design, less welding is required.

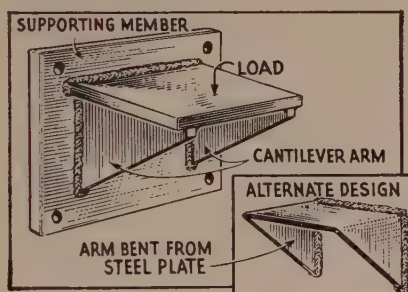


Fig. 2. Simple bracket design for normal loading.

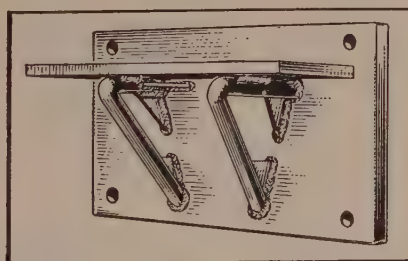


Fig. 5. Light-weight, rigid construction uses tubing.

Improved product appearance and high product strength are combined by using totally enclosed box-type construction (Fig. 6). Individual parts are fabricated from standard mill shapes or are cut from steel plate.

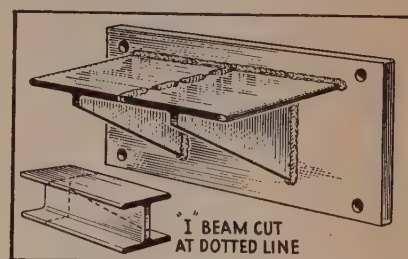


Fig. 3. Alternate welded design for low-cost construction. Standard "I" beams are cut and fillet welded to supporting member.

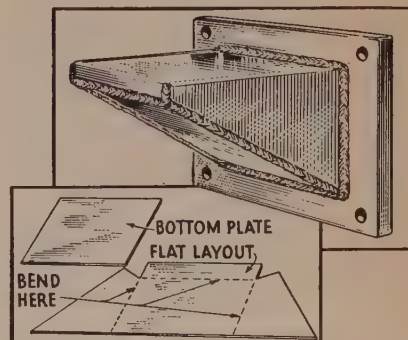


Fig. 6. Improved product appearance . . . box-type construction with members sheared, bent to form and welded.

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Advertisement

Scrap Metal and Secondary Ingot Prices Advance Sharply

New York

... Prices of scrap metals rose sharply last week, accompanied by corresponding increases in the prices of secondary ingots. Primary metals did not advance, but the threat of increases in copper and zinc hung heavily over the market. Copper and brass scrap, aluminum, lead and zinc scrap grades were in even more acute short supply due to the entry into these markets of new buying factors due to the shortage of primary metals.

The copper scrap market has been thrown into a state of confusion by the buying of wire mills at prices up to 22¢ per lb for No. 1 heavy copper and wire, as much as 1¢ higher than the top price being offered by the refineries. Some factors estimate that when the cost of refining and casting into wire bars is added in, the cost of such copper to mills would reach 25½¢ to 26½¢.

With the Utah mine of Kennecott still on strike, there is very little domestic copper available to the market from major producers. A large part of their copper production is naturally earmarked for their own fabricating subsidiaries. No information can be confirmed on premium copper purchases, but it is known that some 1500 tons of Mexican copper cathodes have been offered to at least two consumers at 26.50¢ delivered. The offer was not accepted by either consumer. Were the copper to have been in the form of shapes or wire bars, it might have been another story.

If the Kennecott strike is to continue for much longer, there is no doubt that purchases of copper at premium prices must grow and this will certainly result in a higher do-

Move Leaves Threat of Rises In Primary Metals Hanging Heavily Over The Market

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mestic price. With little copper being sold by major domestic producers, action taken by the small producers would serve to raise the market. Acting on this prospect, Phelps Dodge Co. discontinued its firm price policy as of the end of November and will make subsequent sales on the basis of price at the time of shipment.

Aluminum scrap prices were increased last week by an additional 1¢ per lb. Secondary ingot prices were raised by amounts ranging from ¾¢ to more than 1½¢ per lb. The foundry buying market is extremely active and the ingot producers are hard put to keep up with the demand in view of the shortage of scrap. Secondary ingot prices are as much as 9¢ to 10¢ above the primary ingot market. These high aluminum prices serve to increase the pressure on the zinc die casting market.

Consumers are having great difficulty in obtaining their requirements of zinc. There is no change in the strike situation at two zinc-producing plants of American Zinc, Lead & Smelting Co. Joplin concentrates producers are actively pushing the move for a higher price than the present \$98 a ton concentrates price. Observers are certain that any increase in the concentrates rate will serve to boost the

domestic price. The current export price is 16¼¢ f.a.s. Gulf Ports. There were no significant changes in zinc scrap prices last week.

The lead market is in very short supply. Sales of secondary lead have been made as high as 28¢ for small tonnages. Although most large consumers are staying away from the premium market lest such action serve as an obvious cause for another domestic market increase, it is learned that some are processing lead from their customers that may well have been bought at premium prices. It is learned that some customers of the large consumers are buying finished lead products, sometimes from abroad, for use instead of pig lead.

Scrap lead is being bought by eastern dealers at 19½¢ to 20¢ per lb. It is obvious that this lead is going into above market secondary production. This situation places the custom smelters at a real disadvantage in attempting to produce for a 21.50¢ market with scrap purchased at a price so much out of line with the primary market.

Metals producers are viewing the government's stockpiling program in the light of these market factors. Many of them believe that stockpiling at proposed rates under the present strike and premium price conditions must certainly have a sharp effect on domestic prices. Government officials have already expressed their dissatisfaction with the current rate of copper procurement. The lead industry met with government officials this Tuesday in order to consider means of stepping up the rate of lead procurement.

Now the industry is concerned with the possibility of allocations under government auspices and the prospect of price control if prices should continue to advance. Yet the industry is powerless, by itself, to control availability of metals or prices under the present circumstances.

Nonferrous Metals Prices

	Nov. 3	Nov. 4	Nov. 5	Nov. 6	Nov. 8	Nov. 9
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	15.50	15.50	15.50	15.50	15.50	15.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be, dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$52.00
Cobalt, del'd	\$1.90
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Iridium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110 to \$115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	29.50
Magnesium, sticks, carlots	\$4.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$75 to \$78
Nickel, electro, f.o.b. New York	\$42.90
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$93 to \$96
Silver, New York, cents per oz.	74.75
Tin, Grade A, New York	\$1.03
Zinc, East St. Louis	15.50
Zinc, New York	16.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	\$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)			
5-5-5-5 ingot			
No. 115	21.50*	22.00	
No. 120	21.00*	21.50	
No. 123	20.50*	21.00	
10-10-10 ingot			
No. 305		27.25	
No. 315		24.25	
8-10-2 ingot			
No. 210		33.00	
No. 215		31.00	
No. 245	25.75*	25.75	
Yellow ingot			
No. 405	17.50*	17.50	
Manganese bronze			
No. 421		23.00	
* F.o.b. Philadelphia.			

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

5-5-5 aluminum-silicon alloys	
0.30 copper, max.	30.25-30.75
0.60 copper, max.	29.50-30.25
Piston alloys (No. 122 type)	25.75-26.25
No. 12 alum. (No. 2 grade)	25.75-26.25
0.08 alloy	25.75-26.25
0.95 alloy	25.50-26.00
3 alloy	29.75-30.25
AXS-679	26.50-27.00
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1-95 pct-95 1/2 pct.	28.00-28.50
Grade 2-92 pct-95 pct.	27.00-27.50
Grade 3-90 pct-92 pct.	25.50-26.00
Grade 4-85 pct-90 pct.	25.00-25.50

Electroplating Supplies

Anodes
(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40 1/2
Electrodeposited	34 1/2
Rolled, oval, straight, delivered	37.34
Ball anodes	38 1/2
Brass, 80-20	
Cast, oval, 15 in. or longer	35 1/2
Zinc, oval, 99.99	22.50
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	\$2.00
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	81 1/2

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	62
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Sulfate, crystals, 22.5 pct, bags	5.90
Sulfate, 25 pct, granules, bbls. frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: 1/4 in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to \$1.07; 35 to 37, 45.7¢ to \$1.65; 47 to 49, 67.5¢ to \$2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, 1/4 to 1 1/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, 3/8 to 1 1/2 in., 11S-T3, 37.5¢ to 35.5¢; 1/2 to 2 in., R317-T4, 36.5¢ to 33.5¢; rolled, 1 1/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2 1/2 to 3 1/2 in., R317-T4, 32.5¢ to 31.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSA, 1/4 in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., 1/4 to 0.311, 58¢; 1/2 to 3/4, 46¢; 1 1/4 to 1.749, 43¢; 2 1/2 to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., 1/4 to 0.311, 61¢; 1/2 to 0.749, 48¢; 1 1/4 to 1.749, 44¢; 2 1/2 to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb. per ft. per. up to 5.9 in., 51¢; 0.50 to 0.59 lb. per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb. per ft. per. up to 19.5 in., 44¢; 4 to 6 lb. per ft. per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, 1/4 to 5/16, \$1.14; 5/16 to 3/4, \$1.02; 3/4 to 1, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, 3/4 to 7/16, 85¢; 3/4 to 1, 62¢; 1 to 2 in., 57¢. 0.185 to 0.219, 3/4 to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.28	
Copper, drawn		34.28	
Low brass	38.07*	34.85	35.16
Yellow brass	36.76	33.44	33.75
Red brass	38.55*	35.33	35.64
Naval brass	33.92	32.67	38.61
Leaded brass		28.30	
Commercial			
bronze	39.29*	36.32	36.63
Manganese bronze	37.51	36.01	42.11
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	33.47	32.22	36.66
Everdur, Herculoy, Olympic, etc.	40.43	40.67	41.73
Nickel silver, 10 pct		46.42	44.20
Architectural bronze			32.33

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 or more)

	Heavy	Turn-ings
Copper	21 1/2	20 1/2
Yellow brass	18	17 1/2
Red brass	19 1/2	19
Commercial bronze	19 1/2	19
Manganese bronze	17 1/2	16 1/2
Leaded brass rod ends	17 1/2	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50-21.00
No. 2 copper wire	19.50-20.00
Light copper	18.50-19.00
Refinery brass	18.50*-18.75*

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.75-17.00
No. 1 comp. turnings	16.50-16.75
Rolled brass	13.00-13.50
Brass pipe	13.25-13.75
Radiators	14.00
Heavy yellow brass	12.50-12.75

Aluminum

Mixed old cast	16.00
Mixed old clips	16.25
Mixed turnings, dry	14.00
Pots and pans	16.25
Low copper	18.50-19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18 1/2-18 1/2
No. 2 heavy copper and wire	17 1/2-17 1/2
Light copper	16 1/2-16 1/2
Auto radiators (unsweated)	12 1/2-12 1/2
No. 1 composition	15-15 1/2
No. 1 composition turnings	14 1/2-15
Clean red car boxes	12 1/2-13
Cocks and faucets	12 1/2-12 1/2
Mixed heavy yellow brass	9 1/2-10
Old rolled brass	11 1/2-12
Brass pipe	12 1/2-13
New soft brass clippings	14 1/2-15
Brass rod ends	12-12 1/2
No. 1 brass rod turnings	11 1/2-12

Aluminum

Alum. pistons and struts	8 1/2-9
Aluminum crankcases	11 1/2-12
2S aluminum clippings	15-15 1/2
Old sheet & utensils	11 1/2-12
Borings and turnings	6-6 1/2
Misc. cast aluminum	11 1/2-12
Dural clips (24S)	11 1/2-12

Zinc

New zinc clippings	10 1/2-11
Old zinc	8 1/2-9
Zinc routings	4 1/2-5
Old die cast scrap	5-5 1/2

Nickel and Monel

Pure nickel clippings	22-23
Clean nickel turnings	17-18
Nickel anodes	22-23
Nickel rod ends	21-22
New Monel clippings	15 1/2-16 1/2
Clean Monel turnings	11-12
Old sheet Monel	13-14
Old Monel castings	10-11
Inconel clippings	12-13
Nickel silver clippings, mixed	8-8 1/2
Nickel silver turnings, mixed	7-7 1/2

Lead

Soft scrap lead	19 1/2-20
Battery plates (dry)	13-13 1/2

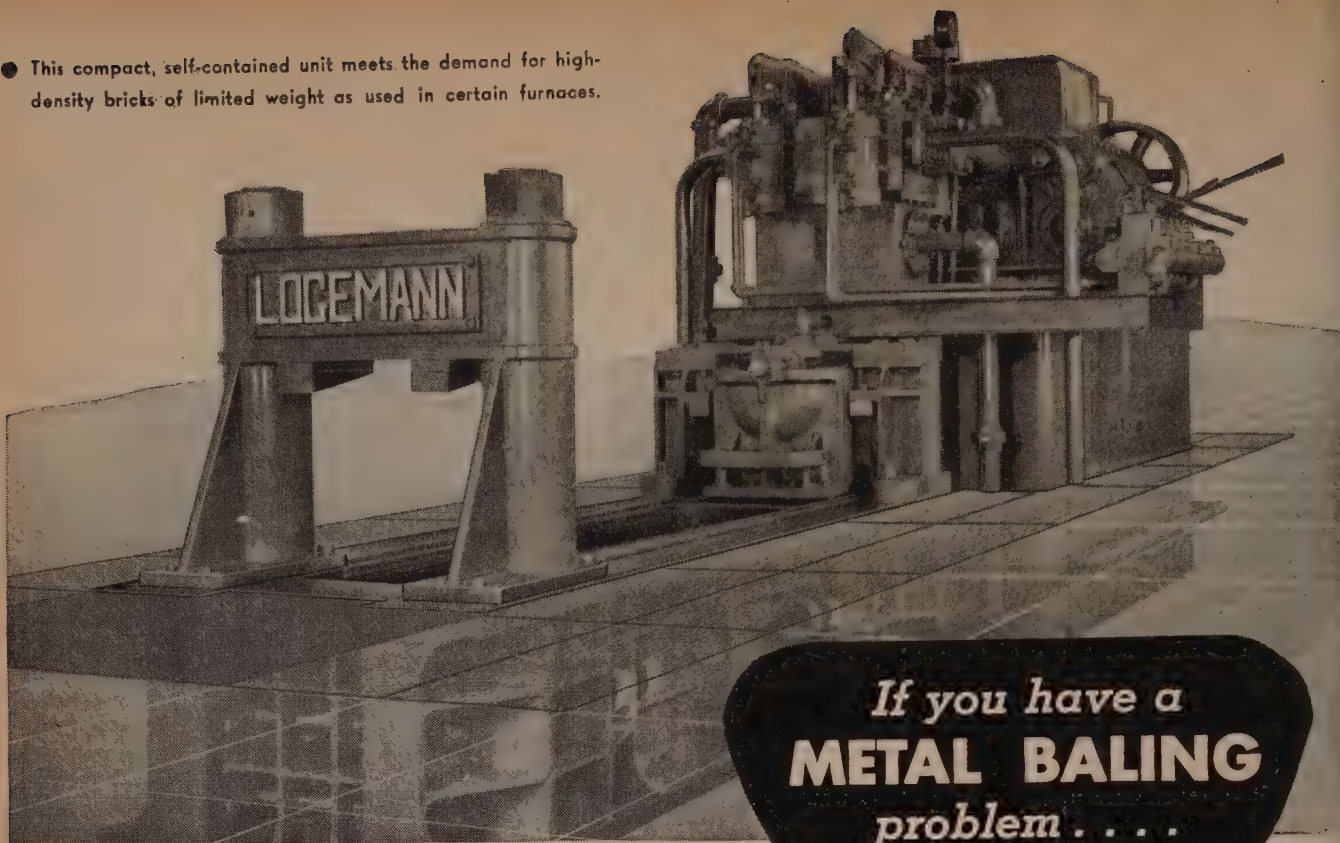
Magnesium Alloys

Segregated solids	8-9
Castings	4 1/2-5 1/2

Miscellaneous

Block tin	82-84
No. 1 pewter	65-67
No. 1 auto babbitt	51-53
Mixed common babbitt	14 1/2-15 1/2
Solder joints	21-22
Siphon tops	50-52
Small foundry type	21-21 1/2
Monotype	20-20 1/2
Lino. and stereotype	19-19 1/2
Electrotype	17 1/2-18
New type shell cuttings	15-15 1/2
Hand picked type shells	6 1/4-7
Lino. and stereo dross	10 1/2-11
Electro dross	7-7 1/2

- This compact, self-contained unit meets the demand for high-density bricks of limited weight as used in certain furnaces.



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Mill Reserves Temporarily Comfortable

New York

• • Only two changes in prices of significance took place this week. No. 1 heavy melting took a 50¢ dip in Philadelphia and went at \$44 to \$45 a ton. This change lowered the IRON AGE scrap composite to \$43, a drop of 16¢. This was the first downward movement in the composite since Mar. 9 of this year. It does not, however, reflect a trend—as yet, but merely designates a price change in that market area for No. 1 heavy melting. Railroad specialties closed at higher prices in Chicago last week, some going up as much as \$2.50 a ton while the cast grades continued to remain strong there, chiefly because of the pig iron shortage. Some mills are still comfortably situated as far as winter backlogs are concerned. They claim 60 to 90 day reserves. But on the other hand, several mills have had their backlogs sliced as much as 15 pct during October—an unhealthy condition to be taking place as winter approaches. Some sources feel that the feeling of complacency that exists over having a good temporary backlog is lulling mills into future difficulty. The answer to this will be found before long.

PITTSBURGH—The market was quiet likewise with shipments running at a fairly good rate. Mixed yard cast iron scrap was the only item that moved, advancing by 50¢. An occasional carload of railroad specialties moved at a little less than the prices quoted here though the bulk of the material went at the prices given. This indicates that price resistance continues in these grades with most of the foundries reporting stocks adequate for several months at least and most buyers waiting for prices to drift a little lower. Prospect of higher income taxes next year will probably be offset by the desire of some dealers to end the year with a substantial inventory on the ground. Better information on the size of the possible taxes may reverse this trend however, and decision to unload may parallel action being taken by nonferrous scrap metal dealers.

CHICAGO—Scrap supplies in this area are adequate for the moment with supplies sight for 60 to 90 days on the average. One of the mills are pushing for more cargoes. They continue to keep a weather eye on their earmarked shipments so that they get everything back that is coming to them. The mills are particularly ap-

thetic about dealer scrap. Ingot makers busy in the conversion market are in another boat, however. Their chief trouble seems to be more one of lining up proper suppliers than one of getting the actual scrap from the field. Railroad specialties closed at higher prices last week. Cast scrap has not weakened chiefly because of the pig iron shortage.

PHILADELPHIA—No. 1 heavy melting scrap is now being sold in this market at \$45 delivered, but other scrap grades are unchanged from last week. Rejections for off-grade scrap, principally bundles, are increasing. There have also been some reports of the rejection of turnings. There has been no further development of the easy market situation reported last week. The prospective strike of longshoremen would curtail unloading of incoming scrap and pig iron carriers and have an important effect on the strength of this market. Any further price developments in the market can be expected to await a strike decision.

CLEVELAND—A seasonal shortage of railroad cars, which first put in an appearance in the East some 2 weeks ago, is curtailing shipments to consumers here and in the Valley by as much as 20 pct. Present indications are that the shortage will run its usual course and continue through November. The shortage is particularly acute in the Valley. Otherwise, the market seems to be settling into a rather quiet pattern for the balance of the year. Mills are comfortable and getting weekly consumption in shipments in most cases, and the foundry grades and malleable are strong.

DETROIT—A strong undertone pervades the Detroit scrap market but prices are continuing at last week's levels. Rumors of over-the-market deals were flying a little faster this week and sources close to the market were predicting that some exciting breaks may be imminent. Recent shipments have been somewhat disappointing; a freight car shortage appears to be the greatest contributing factor. The cast iron market which has had a tendency to sag was bolstered recently by a substantial purchase by a large auto maker. Biggest question for speculation here is whether, in the face of large earmarked shipments out of Detroit, purchases for McClouth are going to change Detroit in effect from a plus into a minus scrap market.

CINCINNATI—All grades are in strong demand here, but there is an equally strong reluctance to pay over-the-market. Mill inventories range up to 60 days, which permits a nominal degree of independence for the time being. Early this week the shortage of freight cars which is hampering the movement of scrap in many other districts had not affected Cincinnati consumers. Cast grades are strong, and gaining sympathetic strength from some of the southern markets.

NEW YORK—Truman was reelected. Everybody was up in the air. Nobody was able to make anything of the uncertainty. So things have begun to fall back in the groove again. Prices, however, remained the same and shipments continued to move normally. But, overcautiousness on the part of the mills and the attack on bundled scrap has led to a shortage of heavy scrap and a falling off of some mill inventories during October. This is considered to be an unhealthy condition approaching winter. Demand for chemical borings is off considerably. Principal sources of consumption are not booking any new business so that they can wind up the year with as low an inventory as possible. The price trend here is downward.

BIRMINGHAM—Northern mills, reluctant to absorb freight rates on scrap originating in Southern districts, are reported to have reduced purchases in this area. Local mills have considerable inventories and are not buying open hearth material in large quantities. Cast iron remains very tight and scrap prices generally are firm.

BOSTON—The opening of the Mystic Iron Works in Everett and the production of pig iron for the first time since early July is the big news here but it has had no effect as yet on prices. Demand in all grades continue spotty and there is no change whatsoever in prices.

BUFFALO—Even if the election did rock a few scrap men back on their heels, the market took it without a quiver. Likelihood of price control action early in 1949, however, made traders more determined to keep commitments close to a spot basis. Also tending to cool bullish enthusiasm were reports that rail specialties in the latest New York Central list went at lower prices, although none of them were awarded to Buffalo consumers. Sales of "super" No. 2 heavy melting—grading above No. 2 but below No. 1—were made to a steel foundry at \$45 and No. 1 steel held to its old range of \$47 to \$49. Buying to fill conversion orders continued at \$1 to \$1.50 over bids of leading consumers and some openhearth scrap was going out of Buffalo on that basis.

SEATTLE—Total purchased scrap requirements in 1949 for both the steel and foundry industry on the West Coast was estimated at 2,394,000 net tons or three times prewar requirements by H. W. Christensen, director of purchases, Columbia Steel Co. and acknowledged prime minister at the court of scrap for the Pacific area.

SAN FRANCISCO—Recent feelers and inquiries have indicated the availability of upwards of 100,000 tons of high grade scrap in the Philippines from war and reconstruction salvage. Since the current differential between the San Francisco and Philadelphia market is \$18 per gross ton and the difference in shipping costs from the Philippines to the Pacific and Atlantic Coast is only \$4, there is every likelihood that this scrap will be shipped to the Atlantic unless it is privately contracted by West Coast major purchasers at considerably above current market here.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 cump'd bundles	42.50 to 43.00
Hand bldd. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.50 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	64.00 to 65.00
Hvy. breakable cast	61.00 to 62.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	57.75 to 58.75
RR. coil springs	57.75 to 58.75
RR. leaf springs	57.75 to 58.75
Rolled steel wheels	57.75 to 58.75
Low phos.	49.00 to 50.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$41.50 to \$42.00
No. 2 hvy. melting	41.50 to 42.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	41.50 to 42.00
Bundled mach. shop turn.	39.50 to 40.00
Galv. bundles	39.50 to 40.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	37.50 to 38.00
Mix. borings and turn.	36.50 to 37.00
Low phos. hvy. forge.	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 50.00
Rerolling rails	69.00 to 71.00
Miscellaneous rails	65.00 to 66.00
Angles & splice bars	58.00 to 59.00
Locomotive tires, cut	59.00 to 60.00
Cut bolster & side frames	51.00 to 52.00
Standard stl. car axles	82.00 to 83.00
No. 3 steel wheels	53.00 to 54.00
Couplers and knuckles	54.00 to 55.00
Rails, 2 ft and under	62.50 to 65.00
Malleable	83.00 to 84.00
No. 1 mach. cast	72.00 to 73.00
No. 1 agricul. cast	63.00 to 64.00
Heavy breakable cast	62.00 to 64.00
RR. grate bars	60.00 to 64.00
Cast iron brake shoes	60.00 to 61.00
Cast iron car wheels	65.00 to 66.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	65.00 to 66.00
Hvy. breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$34.40 to \$36.40
No. 2 hvy. melting	34.40
Nos. 1 and 2 bundles	34.40
Bushellings	34.40
Shoveling turn.	31.40
Machine shop turn.	29.40
Mixed bor. and turn.	29.40
C'l'n cast chem. bor.	38.00 to 39.00
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	59.00 to 60.00
Heavy breakable cast.	53.50 to 54.50
Stove plate	56.00 to 57.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	\$32.50 to 33.00
Machinery cast	63.00 to 65.00
Mixed yard cast	57.00 to 58.00
Shoveling turn.	34.50 to 35.00
Cast iron borings	33.50 to 34.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.50 to 45.50
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn.	36.50 to 37.50
Clean cast chemical bor.	43.00 to 45.00
No. 1 machinery cast.	66.00 to 67.00
No. 1 mixed yard cast.	61.00 to 62.00
Hvy. breakable cast.	62.00 to 63.00
Clean auto cast.	65.00 to 66.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. plate	50.00 to 51.00
Low phos. punchings	51.00 to 52.00
Low phos. bundles	48.00 to 49.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	54.00 to 55.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	65.00 to 67.00
Brake shoes	59.00 to 60.00
Malleable	75.00 to 77.00
Cast iron car wheels	60.00 to 61.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 busheling	40.00
Long turnings	\$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	68.00 to 70.00
Stove plate	64.00 to 65.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	56.00 to 59.00
Rails 3 ft & under	52.00 to 55.00
Cast iron carwheels	57.00 to 58.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$38.50 to \$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast.	59.00 to 60.00
Mixed yard cast	57.00 to 58.50
Heavy breakable cast.	56.00 to 57.00
Charging box cast.	56.00 to 57.00
Unstrp. motor blks.	53.50 to 54.50
C'l'n cast chem. bor.	38.50 to 39.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$47.00 to \$49.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast	66.00 to 68.00
Mixed cupola cast.	66.00 to 68.00
Stove plate	65.00 to 66.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00 to 60.00
Rails 3 ft & under	63.00 to 64.00
RR steel wheels	58.00 to 60.00
RR. coil & leaf spgs.	58.00 to 60.00
RR. knuckles & coup.	58.00 to 60.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.00 to \$42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	73.00 to 75.00
Malleable	79.00 to 81.00
RR. cast.	76.00 to 78.00
Railroad grate bars	60.00 to 62.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	58.00 to 63.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$27.50 to \$30.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast.	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	\$23.00
No. 1 bundles	23.00
No. 2 bundles	22.50
Mechanical bundles	21.00
Mixed steel scrap	19.00
Mixed borings and turnings	17.00
Rails, remelting	23.00
Rails, rerolling	26.00
Bushellings	17.50
Bushellings, new fact, prop'd.	21.00
Bushellings, new fact, unprop'd.	16.00
Short steel turnings	17.00
No. 1 cast	\$48.00 to 50.00
No. 2 cast	44.00 to 45.00
*Ceiling Price.	

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Nov. 9,	Nov. 2,	Oct. 12,	Nov. 11,
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50

Tin and Terneplate:				
(dollars per base box)				
Tinplate (1.50 lb) cokes	\$6.80	\$6.80	\$6.80	\$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special-coated mfg. ternes	5.90	5.90	5.90	4.90

Bars and Shapes:				
(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15

Wire:				
(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:				
(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:				
(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:				
(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron:	Nov. 9,	Nov. 2,	Oct. 12,	Nov. 11,
(per gross ton)	1948	1948	1948	1947
No. 2, foundry, Phila.	\$51.56	\$51.56	\$51.56	\$40.97
No. 2, Valley furnace	46.50	46.50	46.50	36.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	46.00	46.00	46.00	36.00
Basic del'd Philadelphia	50.76	50.76	50.76	40.47
Basic, Valley furnace	46.00	46.00	46.00	36.00
Malleable, Chicago†	46.50	46.50	46.50	36.50
Malleable, Valley	46.50	46.50	46.50	36.50
Charcoal, Chicago	73.78	73.78	73.78	56.04
Ferromanganese†	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
† Average of U. S. prices quoted on Ferroalloy page.

Scrap				
(per gross ton)				
Heavy melt'g steel, P'gh.	\$42.75	\$42.75	\$42.75	\$42.50
Heavy melt'g steel, Phila.	44.50	45.00	45.00	42.50
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	39.50
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n.	47.75	47.75	47.75	46.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	49.50
No. 1, cast, Philadelphia	66.50	66.50	65.50	53.00
No. 1, cast, Chicago	72.50	71.00	69.50	53.50

Coke, Connellsville:				
(per net ton at oven)				
Furnace coke, prompt	\$15.00	\$15.00	\$15.00	\$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00

Nonferrous Metals:				
(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	80.00
Zinc, East St. Louis	15.50	15.50	15.00	10.50
Lead, St. Louis	21.30	21.30	19.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 93 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)

Nov. 9, 1948	3.75628¢*	per lb.
One week ago	3.75628¢*	per lb.
One month ago	3.75628¢*	per lb.
One year ago	3.19541¢	per lb.

* Revised.

	HIGH		LOW	
1948	3.75325¢	July 27	3.22566¢	Jan. 1
1947	3.19541¢	Oct. 7	2.87118¢	Jan. 7
1946	2.83599¢	Dec. 31	2.54490¢	Jan. 1
1945	2.44104¢	Oct. 2	2.38444¢	Jan. 2
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5
1943	2.29176¢		2.29176¢	
1942	2.28249¢		2.28249¢	
1941	2.43078¢		2.43078¢	
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16
1939	2.35367¢	Jan. 3	2.26689¢	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2
1933	1.95578¢	Oct. 3	1.75836¢	May 2
1932	1.89196¢	July 5	1.83901¢	Mar. 1
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29
1930	2.25488¢	Jan. 7	1.97319¢	Dec. 9
1929	2.31773¢	May 28	2.26498¢	Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

....	\$46.82	per gross ton
....	\$46.82	per gross ton
....	\$46.82	per gross ton
....	\$37.06	per gross ton

	HIGH		LOW	
1948	\$46.82	Oct. 12	\$39.58	Jan. 6
1947	37.98	Dec. 30	30.14	Jan. 7
1946	30.14	Dec. 10	25.37	Jan. 1
1945	25.37	Oct. 23	23.61	Jan. 2
1944	\$23.61		\$23.61	
1943	23.61		23.61	
1942	23.61		23.61	
1941	\$23.61	Mar. 20	\$23.45	Jan. 2
1940	23.45	Dec. 23	22.61	Jan. 2
1939	22.61	Sept. 19	20.61	Sept. 12
1938	23.25	June 21	19.61	July 6
1937	23.25	Mar. 9	20.25	Feb. 16
1936	19.74	Nov. 24	18.73	Aug. 11
1935	18.84	Nov. 5	17.83	May 14
1934	17.90	May 1	16.90	Jan. 27
1933	16.90	Dec. 5	13.56	Jan. 3
1932	14.81	Jan. 5	13.56	Dec. 6
1931	15.90	Jan. 6	14.79	Dec. 15
1930	18.21	Jan. 7	15.90	Dec. 16
1929	18.71	May 14	18.21	Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

.....	\$43.00	per gross ton
.....	\$43.16	per gross ton
.....	\$43.16	per gross ton
.....	\$41.50	per gross ton

	HIGH		LOW	
1948	\$43.16	July 27	\$39.75	Mar.
1947	42.58	Oct. 28	29.50	May 2
1946	31.17	Dec. 24	19.17	Jan.
1945	19.17	Jan. 2	18.92	May 2
1944	19.17	Jan. 11	15.76	Oct. 2
1943	\$19.17		\$19.17	
1942	19.17		19.17	
1941	\$22.00	Jan. 7	\$19.17	Apr. 1
1940	21.83	Dec. 30	16.04	Apr.
1939	22.50	Oct. 3	14.08	May 1
1938	15.00	Nov. 22	11.00	June
1937	21.92	Mar. 30	12.67	June
1936	17.75	Dec. 21	12.67	June
1935	13.42	Dec. 10	10.33	Apr. 2
1934	13.00	Mar. 13	9.50	Sept. 2
1933	12.25	Aug. 8	6.75	Jan.
1932	8.50	Jan. 12	6.43	July
1931	11.33	Jan. 6	8.50	Dec. 2
1930	15.00	Feb. 18	11.25	Dec.
1929	17.58	Jan. 29	14.08	Dec.

Based on No. 1 heavy melting steel scrap quotations to consumer at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS															
Carbon forging	\$50.00														
Alloy	\$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling ¹²	\$52.00				\$52.00	\$52.00	(per net ton)						\$52.00		
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	(per net ton)						\$61.00		
Alloy	\$63.00	\$63.00				\$63.00	(Bethlehem, Canton, Massillon = \$63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05 ¹³ 4.10 ¹⁴	
SHEETS															
Hot-rolled ⁶	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95 ¹⁵	5.65
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15 ¹⁵	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes ² (10 gage)	4.80		4.80							4.80					
TRIP															
Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	5.90
Cold-rolled ⁴	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			7.10
INPLATE															
Cokes, 1.50 lb. ⁵ base box	\$6.80	\$6.80	\$6.80		\$6.90			\$6.90	\$7.00	Warren, Ohio = \$6.80				Pittsburg, Cal. = \$7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct \$1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
ERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING	Deduct \$1.60, \$1.70 and \$1.60 respectively from 1.50 lb. coke base box price														
55-70 lb, 75-95 lb, 100-128 lb															
BLACKPLATE, h.e., 29 ga. ¹⁰	4.75	4.75	4.75					4.85							
BEAMS															
Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10	5.30
Cold-finished ⁸	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75				Bethlehem, Canton, Massillon = 3.75	4.05	3.75	4.80 ¹⁴	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65				Massillon = 4.65 Worcester 4.95				
PLATE															
Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Cons hohocken	3.45 = 3.95	3.40	3.45 Coatesville = 3.75, Claymont = 3.95 Geneva = 3.40, Harrisburg = 6.50				3.65	3.45	4.30 ¹⁶	5.80
Floor plates	4.55	4.55		4.55				Cons hohocken = 4.55							
Alloy	4.40	4.40									Coatesville = 5.10				
HAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30					Bethlehem = 3.30, Geneva, Utah = 3.25		3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE ⁹															
Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25			Duluth = 4.15, Worcester = 4.45		4.15	5.15 ¹³	
Spring (high carbon)	5.20	5.20		5.20				5.30			Worcester = 5.50 New Haven, Trenton = 5.50		5.20	Duluth = 5.20-6.15	
CLING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingot, rerolling.....	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings.....	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging.....	24.25- 26.50	24.25- 26.50	26.25- 28.75	25.50- 27.75	39.00- 42.75	32.75- 35.75	19.50- 21.50	20.00- 21.75	20.00- 21.75
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets.....	37.50- 40.75	37.50- 40.75	39.50- 43.00	39.50- 43.00	53.00- 57.25	50.00- 54.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50- 30.75	33.00- 33.50	36.50- 39.50	35.00- 35.75	55.00- 57.25	48.50- 50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium.....					52¢
Oil harden manganese.....					29¢
Special carbon.....					26.5¢
Extra carbon.....					22¢
Regular carbon.....					19¢
Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.					

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon.....	4.00¢
0.41 to 0.60 carbon.....	5.50¢
0.61 to 0.80 carbon.....	6.10¢
0.81 to 1.05 carbon.....	8.05¢
1.06 to 1.35 carbon.....	10.35¢
Worcester, add 0.30¢.	

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.....	\$27.00	
Washington, Pa.....	\$26.50	\$22.50
Claymont, Del.....	\$26.50	
Conshohocken, Pa....		\$22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.....	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.....	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.....	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.....		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburgh	Calif.
Standard & coated nails* 103	123		
Galvanized nails*..... 103	123		
Woven wire fence†..... 109	132		
Fence posts, carloads††. 114			
Single loop bale ties..... 106	130		
Galvanized barbed wire** 123	143		
Twisted barless wire... 123			

* Pgh., Chl., Duluth; Worcester, 6 col-
umns higher. † 15½ gage and heavier
** On 80 rod spools, in carloads. †† Duluth
only.

	Base per 100 lb	Pittsburgh	Calif.
Annealed fence wire†... \$4.80	\$5.75		
Annealed, galv. fencing†. 5.25	6.20		
Cut nails, carloads††.... 6.75			

† Add 30¢ at Worcester; 10¢ at Spar-
rows Pt.
†† Less 20¢ to jobbers.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature.....	5.45
Electrical.....	5.95
Motor.....	6.70 to 9.20
Dynamo.....	7.50 to 10.00
Transformer 72.....	8.05 to 11.80
Transformer 65.....	8.60 to 12.35
Transformer 58.....	9.30 to 13.05
Transformer 52.....	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....	\$3.20
Joint bars, 100 lb.....	4.25
Light rails (from billets) per 100 lb.....	3.55

Base Price
cents per lb

Track spikes.....	5.35
Axles.....	5.20
Screw spikes.....	8.00
Tie plates.....	4.05
Tie plates, Pittsburgh, Calif.*.....	4.20
Track bolts, untreated.....	8.25
Track bolts, heat treated, to rail- roads.....	8.50
*Seattle, add 30¢.	

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn- alloy	Hi Steel	Mayar R	Otis- coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie- Illinois, Republic	Republic	Alan Wood	Inland	Bethle- hem	Jones & Laughlin	Youngs- town Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
	Hot-rolled....	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
	Cold-rolled....	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
	Galvanized....	....	6.75	....	....	6.75	....	....	....
Strip									
	Hot-rolled....	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
	Cold-rolled....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes.....	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams.....	....	4.95	....	....	....	....	....	....	....
Bars									
	Hot-rolled....	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes.....	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, \$200.00 per net ton.

Standard, threaded and coupled

	Black	Galv.
1 in.	43 to 41	22½ to 20
1½ in.	46 to 44	26½ to 24
2 in.	48½ to 46½	29½ to 27
2½ in.	49 to 47	29½ to 27½
3 in.	49½ to 47½	30½ to 28
3½ in.	50 to 48	30½ to 28½
4 in.	50½ to 49½	31 to 29

	Black	Galv.
1 in.	39½	20
1½ in.	39½	24
2 in.	46½ to 42	27 to 22½

	Black	Galv.
1 in.	38½ to 37	18½ to 7½
1½ in.	41½ to 35	21½ to 13
2 in.	43½ to 38½	23½ to 19

	Black	Galv.
1 in.	+20½	+50
1½ in.	+10½	+39
2 in.	+4½	+30
2½ in.	+1½	+26½
3 in.	-2	+26

	Black	Galv.
1 in.	+7½	+34
1½ in.	+5	+29½
2 in.	list	+23½
2½ in.	+2	+25

Strong, plain ends

	Black	Galv.
1 in.	42 to 40	23 to 20½
1½ in.	46 to 44	27 to 24½
2 in.	48 to 46	30 to 27½
2½ in.	48½ to 46½	30½ to 28
3 in.	49 to 47	31 to 28½
3½ in.	49½ to 47½	31½ to 29
4 in.	50 to 48	32 to 29½

	Black	Galv.
1 in.	39½	21
1½ in.	44½	26
2 in.	48 to 44	29½ to 25

	Black	Galv.
1 in.	37½ to 32½	18½ to 14
1½ in.	41½ to 36½	22½ to 18
2 in.	45	26½ to 26

	Black	Galv.
1 in.	+16	+44
1½ in.	+9½	+37
2 in.	-1½	+26

	Black	Galv.
1 in.	+4½	+30½
1½ in.	5	+19
2 in.	-1	+23½

For threads only, butt weld, lap weld and less pipe, one point higher discount (per price) applies. For plain ends, weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (per price) applies, while for lap weld and seamless 3½-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, orders are granted a discount of 5 pct. on all shipments, prices are determined adding 25 pct and 30 pct and the car freight rate to the base card. F.o.b. Fontana prices average 17 pts lower discount (higher price) on 5, 14 points on galvanized.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in standard lots, cut length 4 to 24 ft inclusive.

Gage	Seamless	Electric Weld
BWG	H.R.	C.D.
13	19.18	22.56
12	25.79	30.33
12	28.68	33.76
11	35.85	42.20
10	44.51	52.35

CAST IRON WATER PIPE

	Per net ton
24-in., del'd Chicago	\$106.70
24-in., del'd N. Y.	103.50 to 108.40
24-in., Birmingham	93.50
and larger, f.o.b. cars, San Francisco, Los Angeles, for all shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ¾ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1½ to 1½ in. inclusive	32
1½ in. and larger	27
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts

	USS	SAE
7/16 in. and smaller	41	
¾ in. and smaller	38	
¾ in. through 1 in.	39	
9/16 in. through 1 in.	37	
1½ in. through 1½ in.	35	37
1½ in. and larger	28	
In full case lots, 15 pct additional discount.		

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48
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Cap and Set Screws

(In packages)

Pct Off List

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

	Base price per net ton
Effective CaF, Content:	
70% or more	\$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron a.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+ % Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+ % Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to \$1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.35¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	\$2.55
Chromium, electrolytic, 99% min.	\$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	\$1.155
Tungsten, 99%	\$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	\$14.50 to \$15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	\$16.00 to \$18.00
Foundry, Byproduct	
Buffalo	\$22.65
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

	Carloads, Per 1000
Fire Clay Brick	
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	\$69.00

Magnesite Brick

Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

	Std. ¾-in. grains
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25
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WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (16 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	\$5.15- 5.71	\$6.31- 6.57	\$7.27- 7.47	\$5.35- 5.66	\$6.51	\$5.37- 5.52	\$5.09- 5.24	\$5.35- 5.57	\$6.16- 6.31	\$9.14	\$9.29	\$10.54	\$10.69
New York	5.40- 5.98	6.28- 6.43	7.25- 7.73	5.58- 5.88	6.48- 6.73	5.62 5.78	5.32- 5.58	5.53- 5.63	6.18- 6.38	9.17- 9.53	9.32- 9.68	10.40- 10.77	10.55- 10.92
Boston	5.48- 5.64	6.39 6.79	7.56- 7.89	5.54- 5.89	6.75- 6.79	5.74	5.39- 5.54	5.48- 5.59	6.24- 6.34	9.40- 9.44	9.55- 9.59	10.84- 10.94	10.92- 11.05
Baltimore	5.28	6.18	7.15- 7.38	5.34		5.53	5.33- 5.39	5.39	6.13	....	....	....	....
Chicago	4.85- 5.10	5.78- 5.95	6.95- 7.05	4.85- 5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02- 5.07	5.92	7.12- 7.22	5.02- 5.37	6.32	5.22- 5.27	5.07	5.07	5.87	9.15- 9.17	9.32	10.52- 10.57	10.67- 10.72
Norfolk	5.75					6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98- 5.20	5.75 ¹ - 6.04 ¹	7.18- 7.24	5.02- 5.65	6.70	5.35- 5.64	5.16- 5.42	5.15- 5.34	5.70- 5.95	9.14- 9.66	9.29- 9.89	11.05	11.30
Buffalo	4.85- 5.10	5.75- 5.85	7.55- 7.70	5.55- 5.58	6.35	5.45- 5.46	5.10	5.15- 5.20	5.80- 6.05	9.05- 9.35	9.40- 9.50	10.75	20.90
Detroit	5.20- 5.55	6.05- 6.50	7.45	5.25- 5.70	6.25- 6.55	5.50- 5.55	5.30- 5.37	5.30- 5.32	6.02- 6.07	9.31- 9.55	9.20- 9.47	10.72- 10.95	10.87- 11.10
Cincinnati	5.14- 5.36 ⁸	5.82- 6.21 ⁸	6.97- 7.45	5.25- 5.82 ⁸	6.31	5.50- 5.71 ⁸	5.30- 5.47 ⁸	5.30- 5.62 ⁸	6.06- 6.17 ⁸	9.31- 9.35	9.50- 9.51	10.75- 10.78	10.90- 10.91
St. Louis	5.19	6.04- 6.09	7.29- 7.39	5.19- 5.79	6.49	5.39- 5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85- 4.90	5.75 ¹ 6.05	6.95- 7.05	5.00- 5.35	5.95	5.05- 5.25	4.90- 5.15	4.90- 5.10	5.65- 5.80	9.35	9.60	10.40	10.55- 10.80
St. Paul	5.41	6.31	7.30- 7.61	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92		9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05 ¹	6.36	6.45	5.05 ¹¹	6.36	5.25 ¹¹	5.00 ¹¹	5.00 ¹¹	6.66	....	....	....	....
Houston	6.40		8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30- 6.40	7.85 ¹ - 7.90	7.95- 8.55	6.60- 6.66	9.35 ⁵	5.95- 6.10	5.75- 5.90	6.05	7.85 ¹⁵ - 7.95	10.35 ¹⁵	10.20 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
San Francisco	5.95 ⁸	7.15 ²	8.05- 8.55 ²	6.75 ⁹	8.25	6.30- 7.68 ⁸	5.90- 6.90	5.90	7.55	10.35 ¹⁵	10.20 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Portland	6.50 ⁴	8.00 ²	8.45 ²	6.85 ⁴	....	6.30 ⁴	6.25 ⁴	6.25 ⁴	8.25 ⁴	....	10.45 ¹⁵	....	12.05 ¹⁵
Seattle	6.20 ⁴ - 6.30 ⁴	7.75 ² - 7.85 ²	7.85- 8.00	6.85 ⁴ - 6.65 ⁴	....	6.20- 6.30	6.15- 6.25	6.05 ⁴ - 6.15 ⁴	8.00 ¹⁴ - 8.10 ¹⁴	....	10.30 ¹⁵ - 10.40 ¹⁵	....	12.00 ¹⁵ - 12.05 ¹⁵
Salt Lake City	6.15- 8.00	7.35	7.90- 9.06	7.10- 7.45	....	5.75- 6.65	6.65- 7.00	6.95- 7.25	7.55- 8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to

9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00					Boston	Everett	\$0.50 Arb.		49.50	50.00		
Birmingham	42.88	43.38				Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Buffalo	47.00- 48.00*	47.00- 48.00*	47.50- 48.50*			Brooklyn	Bethlehem	3.90	61.90				
Chicago	46.00	46.00	46.50	47.00		Cincinnati	Birmingham	6.09	48.97	49.47			
Cleveland	46.00	46.50	46.50	47.00	51.00	Jersey City	Bethlehem	2.39	50.39				
Duluth	46.00	46.00	46.50	47.00		Los Angeles	Provo	6.83	52.93	53.43			
Erie	45.50	46.00	46.50	47.00		Mansfield	Cleveland-Toledo	3.03	49.03- 48.53	49.53- 49.03	49.53	50.03	54.03
Everett		49.50	50.00			Philadelphia	Bethlehem	2.21	50.21				
Granite City	47.90	48.40	48.90			Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	
Ironton, Utah	62.00	62.50				Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
Lone Star, Texas		75.00†				San Francisco	Provo	6.83	52.93	53.43			
Neville Island	46.00	46.50	46.50			Seattle	Provo	6.83	52.93	53.43			
Provo	46.00	46.50				St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65		
Sharpsville	46.00	46.50	46.50	47.00									
Steelton	48.00	48.50	49.00	49.50	54.00								
Struthers, Ohio	46.00												
Swedeland	50.00	50.50	51.00	51.50									
Toledo	45.50	46.00	46.50	47.00									
Troy, N. Y.					54.00								
Youngstown	46.00	46.50	46.50										

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio - \$59.50; f.o.b. Buffalo \$60.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.5 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above ferryl iron prices comparable analysis.

Charcoal pig iron base price for low phosphorus \$66.00 per gross ton, f.o.b. Lysle, Tenn. Delivered Chicago, \$73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Manganese

% Mn, Maximum contract base	
ross ton, lump size.	
irmingham	\$162
Niagara Falls, Alloy, W. Va., Wel-	
Ont.	\$160
ohnstown, Pa.	\$162
heridan, Pa.	\$160
Rockwood, Tenn.	\$165
tna, Pa.	\$163
for each 1% above 82% Mn;	
\$2.00 for each 1% below 78%.	
ets—Cents per pound of briquet,	
d, 66% contained Mn.	
, bulk	10.0
n lots	11.6
	12.5

Iron

act prices, gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
on, Pa., \$61.00	\$62.00
Chicago 65.00	66.00

Steel Metal

act basis, 2-in. x down, cents per	
f metal, delivered.	
min. Mn, 0.2% max. C, 1% max.	
max. Fe.	
packed	35.5
	37.0

Allytic Manganese

Knoxville, Tenn., freight allowed	
Mississippi, cents per pound.	
	32
	34
n lots	36

Carbon Ferromanganese

act price, cents per pound Mn con-	
lump size, delivered.	

	Carloads	Ton	Less
max. C. 0.06%			
% Mn.	25.25	27.10	28.30
max. C.	24.75	26.60	27.80
max. C.	24.25	26.10	27.30
max. C.	23.75	25.60	26.80
max. C.	23.25	25.10	26.30
max. C.			
max. Si	20.25	22.10	23.30

Manganese

act basis, lump size, cents per	
f metal, delivered, 65-68% Mn,	
Si, 1.5%, max. C.	
bulk	8.60
contract basis, carlots, bulk	10.25
ed, per lb of briquet	10.0
	11.6
lots	12.5

Iron (electric furnace)

01 to 14.50 pct., f.o.b. Keokuk,	
enhearth \$84.00, foundry, \$85.00;	
f.o.b. Niagara Falls; Electric fur-	
very iron is not being produced at	
Add \$1.00 per ton for each ad-	
0.50% Si up to and including	
1d \$1.00 for each 0.50 pct Mn over	

Metal

act price, cents per pound con-	
lump size, delivered, for ton lots	
% Fe.	20.70
% Fe.	21.10

Briquets

act price, cents per pound of	
bulk, delivered, 40% Si, 1 lb Si	
bulk	5.90
lots	7.50
	8.40

Ferrosilicon

act price, cents per pound con-	
t, lump size, bulk, in carloads,	
	17.50
	10.50
	13.00
	14.65
	16.50

Metal

in zone contract prices, cents per metal, delivered.			
	Cast Turnings Distilled		
.....	\$2.05	\$2.95	\$3.75
Tots	2.40	3.30	4.55

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, con-	
tained Cr, lump size, bulk, in carloads, de-	
livered.	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per	
pound of briquet, delivered, 60% chromium.	
Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N.	
Add 5¢ per lb to regular low carbon	
ferrochrome price schedule. Add 5¢ for	
each additional 0.25% N.	

S. M. Ferrochrome

Contract price, cents per pound chro-	
mium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6%	
Si, 4-6% Mn, 4-6% C.	
Carload	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si.	
4-6% Mn, 1.25% max. C.	
Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium	
contained packed, delivered, ton lots. 97%	
min. Cr. 1% max. Fe.	
0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump,	
delivered.	
30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy,	
lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of al-	
loy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21%	
Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-	
16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	13.75
Less ton lots	21.00

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspen-	
sion Bridge, N. Y., freight allowed, max.	
St. Louis. V-5: 33-42% Cr, 17-19% Si,	
8-11% Mn. V-7: 23-32% Cr, 15-21% Si,	
14-16% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Sus-	
sension Bridge, N. Y., freight allowed,	
max. St. Louis. Si 56%, Ti 9%, Ca 5%.	
Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy,	
delivered. 60-65% Si, 5-7% Mn, 5-7% Zr,	
20% Fe, ½ in. x 12 mesh.	
Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or	
¼ x down, packed, per pound	
contained W, 5 ton lots, de-	
livered	\$2.25
Ferrovanadium, 35-55%, contract	
basis, delivered, per pound, con-	
tained, V.	
Openhearth	\$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92%	
V ₂ O ₅ contract basis, per pound	
Contained V ₂ O ₅	\$1.20
Ferrocolumbium, 50-60% contract	
basis, delivered, per pound con-	
tained Cb.	
Ton lots	\$2.75
Less ton lots	\$2.80
Ferromolybdenum, 55-75%, f.o.b.	
Langeloth, Washington, Pa., per	
pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b.	
Langeloth, Washington, Pa., per	
pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b.	
Langeloth and Washington, Pa.,	
per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b.	
Langeloth and Washington, Pa.,	
per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C	
max., f.o.b. Niagara Falls, N. Y.,	
ton lots, per pound contained Ti.	\$1.23
Ferrotitanium, 20-25%, 0.10% C	
max., ton lots, per pound con-	
tained Ti	\$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-	
20%, 6-8% C, contract basis,	
f.o.b. Niagara Falls, freight al-	
lowed, carloads, per net ton.	\$160.00
Ferrophosphorus, electrolytic, 23-	
26%, carlots, f.o.b. Siglo, Mt.	
Pleasant, Tenn., \$3 unitage, per	
gross ton	\$65.00
10 tons to less carload.	75.00
Zirconium, 35-40%, contract basis,	
f.o.b. plant, freight allowed, per	
pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis,	
lump, delivered, per pound of	
alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe,	
contract basis, f.o.b. Suspension	
Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20%	
Al, contract basis, f.o.b. Philo,	
Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy,	
delivered.	
Ferroboration, 17.50% min. B, 1.50% max.	
Si, 0.50% max. Al, 0.50% max. C, 1 in.	
x D.	
Ton lot	\$1.20
Manganese—Boron 75.00% Mn.	15-20%
B, 5% max. Fe, 1.50% max. Si, 3.00%	
max. C, 2 in. X D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al,	
1.50% max. Si, 0.50% max. C, 3.00%	
max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa.,	
freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension	
Bridge, N. Y., freight allowed,	
Ti 15-18%, B 1.00-1.50%, Si 2.5-	
3.0%, Al 1.0-2.0%.	
Ton lots, per pound.	8.625¢
Borosil, f.o.b. Philo, Ohio, freight	
allowed, B 3-4%, Si 40-45%, per	
lb contained B	\$6.25



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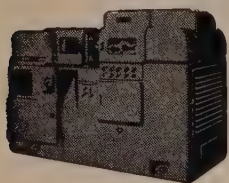
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Studies Practical Welding Problems

• Abstracts of some papers presented at the meetings of the various technical societies participating in the National Metal Congress and Exposition, held in Philadelphia, Oct. 25 to 29, are presented here with. Additional abstracts were published in *IRON AGE*, Nov. 4, p. 109.

AT the AWS meetings on resistance welding, two award-winning papers were presented. One on the welding characteristics of dry rectifier welders and resistance welding of cross-wires. R. C. Jones, of Taylor-Winfield Co., Warren, Ohio, made a study of the effect of welding variables upon the strength and appearance of cross-wire welds. The work was limited to and cold-drawn low carbon steel of $\frac{1}{2}$ in. diam and $\frac{1}{8}$ in. min diam. Each wire diameter was studied under 15, 30 and 50 pct setdown. Correlation of the data permitted the selection of welding variables that will consistently produce high strength welds of good appearance.

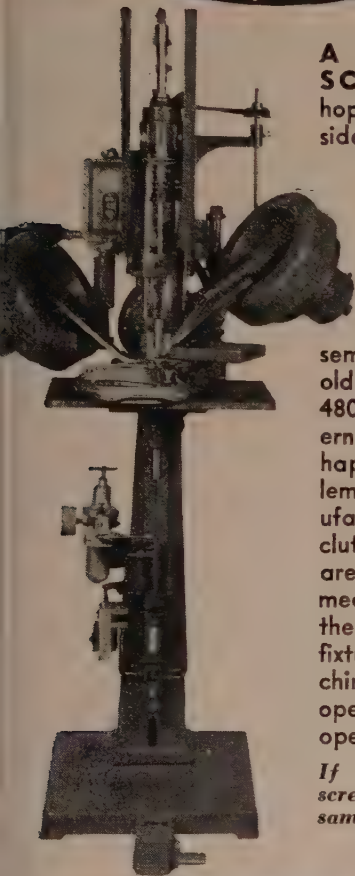
A number of different welding machines were used in making the wire welds, including portable type, full-automatic, direct air operated, and others. Flat, copper, water-cooled electrodes were used in all cases. After the investigation it was evident that appearance of welds made at a fixed welding time and percent setdown progressed through a definite cycle as the electrode force was gradually increased from a low value. This same cycle was noted for every wire diameter and percent setdown investigated except in $\frac{1}{2}$ in. diam wire setdown 15 pct. These conditions probably existed for this wire size also, but were not observable because of the small volume of displaced metal.

Electrode force was increased several times with varying results. The weld selected as most suited to normal applications was one in which the force was sufficient to cause extruded metal to become uniform with a few loose feather edges. This opinion was based upon evidence indicating that such an appearance could be obtained without loss of strength and a comparison of this condition with welds from production lines.

Satisfactory appearance can be obtained without loss of strength by proper selection of welding variables, according to the paper. The most important variable is weld time, the welding current and electrode force required being dependent upon the choice of weld time. With other factors remaining constant, the welding current is practically constant over a large range of electrode force. Cold drawn and hot drawn basic low-carbon steel wire requires the same electrode force for satisfactory appearing cross-wire welds when other variables are fixed.

Welding currents for crossed-wire welds in

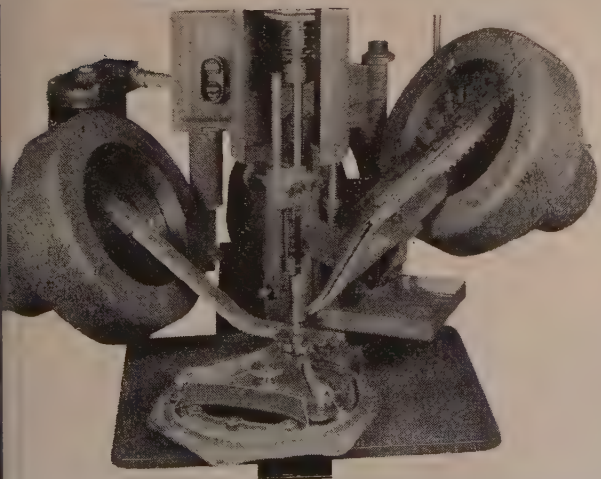
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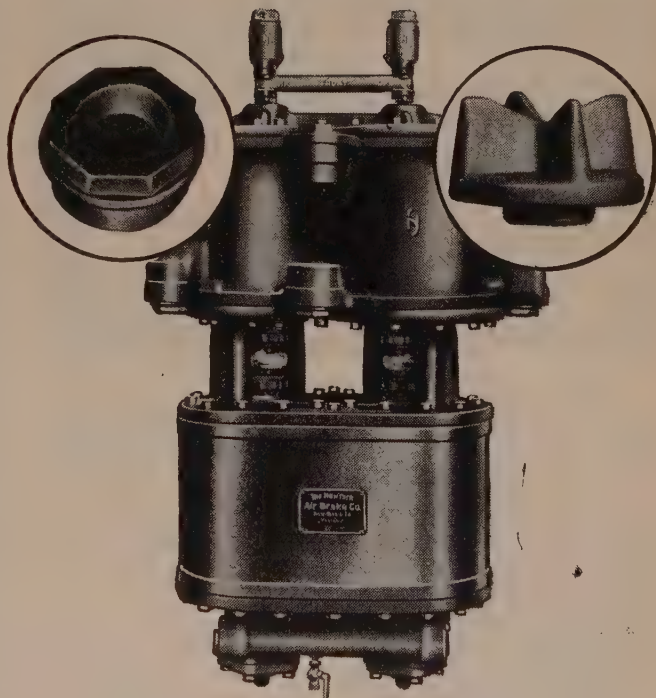
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drawn wire are somewhat higher than those required for welding cold drawn low-carbon steel wire, while welds in the cold drawn wire are stronger than their equivalent welds in hot drawn wire. No great strength advantage was obtained by setting wires together with more than a 30 pct setdown.

Because desired conditions, i.e., strength, appearance, production, etc., permit no ideal setup for welding cross-wires, a compromise of these desired conditions must be made. The author states that the choice of variables should be such that maximum strength together with good appearance can be developed using a minimum length of weld time and weld force. This selection, he points out, should be tempered by judgment where the use of minimum time would necessitate values occurring on the steeper slopes of the force and current curves and so become relatively critical schedules. With all considerations in mind, a table of recommended schedules was worked out to show time, electrode force, current and strength of welds for cold drawn and hot drawn low-carbon steel crossed-wire welds.

Because of the variety of applications of crossed-wire welds the investigation will be continued. The prospective program will likely include the following points: (1) welding wires of 1/16 in. diam together; (2) single welds using wires of unequal diameter; (3) single welds using wires of equal diameter where the final diameter at the weld is equal to the diameter of one wire (100 pct setdown); and (4) multiple welds.

A paper containing data on a method of treatment that permits beryllium-copper to be brazed with silver alloys that flow in the range of 1145° to 1200°F with subsequent development of full hardness was presented under the title of "Silver Alloy Brazing Beryllium-Copper Alloys," by A. M. Setapen and W. D. Warren, both affiliated with Handy & Harmon, New York. Brazing of beryllium-copper alloys with low temperature silver brazing alloys has not been extensive because of the belief that reasonable high hardnesses are not attainable after heating to 1200° to 1300°F for brazing, since an increasing loss in hardness of beryllium-copper results from heating this material over about 625°F.

However, published data show the effect of this temperature on a scale of hours and do not clearly indicate the effect of short time heating. On the basis of short time heating, the authors point out that parts of small section could be silver brazed at temperatures up to 1300°F without seriously disturbing the precipitable phase if the heating for brazing was kept within a matter of a few minutes. Brazed assemblies could then be hardened by the normal aging treatment at 600°F.

A series of tests using strip stock of various thicknesses, hardnesses, and widths were made and the data for torch and furnace brazing followed by various aging times were discussed.

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was found that the hardness of beryllium-copper after furnace brazing was of the same order that at the joint in torch brazing. Hardening response on aging, however, was less than torch brazing and averaged 50 to 55 R_{30N} as compared to a potential full hardness of 60 to 65 obtained by torch brazing. While torch brazing at 1145° to 1200°F can be performed and brazing assemblies subsequently aged to full hardness, was found that when material less than 0.020 thick is used and maximum hardening response is desired, considerable operator skill and care are required. Joint strengths up to 90,000 psi have been obtained on brazed and age hardened butt-joints. The principal cause of low joint strength was found to be flux entrapped in the joint. While flux is completely fluid and active above 1100°F, because of the refractory nature of beryllium oxide it is essential to use undiluted flux and some superheat above 1100°F to get the maximum oxide solvency at the time the brazing alloy flows.

Other variables and results of the investigations were discussed by the authors, who stressed their belief that beryllium-copper has a sufficient latitude so that low-temperature silver alloy brazing involving temperatures up to 1250° to 1300° and short heating times can be performed without seriously affecting subsequent age hardening ability.

The Aircomatic Process, a manual or automatic method of inert-gas-shielded arc welding, was described in a paper by J. S. Sohn of Air Reduction Laboratories, Murray Hill, N. J., and A. N. Kugler of the technical sales division of Air Reduction Co., New York. One of the features of Aircomatic is the use of very high current densities, along with equipment capable of providing the filler wire at the high speeds required, ranging from 100 to 300 ipm. The paper

TABLE I
Heli-Welding Speed Ranges With and Without Filler
Metal Where Finish Is A Consideration
WITH FILLER

Thickness, in.	Speed, ipm	
	Min.	Max.
0.028.....	20	24
0.031.....	18	22
0.034.....	18	22
0.037.....	18	22
0.045.....	16	20
0.050.....	16	20
0.062.....	14	18
0.078.....	14	18
0.093.....	14	18
0.109.....	12	16
0.125.....	12	16
0.140.....	9	13
0.187.....	8	12

WITHOUT FILLER

Thickness, in.	Min.	Max.
0.028.....	16	18
0.031.....	18	20
0.034.....	20	22
0.037.....	20	22
0.043.....	22	24
0.050.....	22	24

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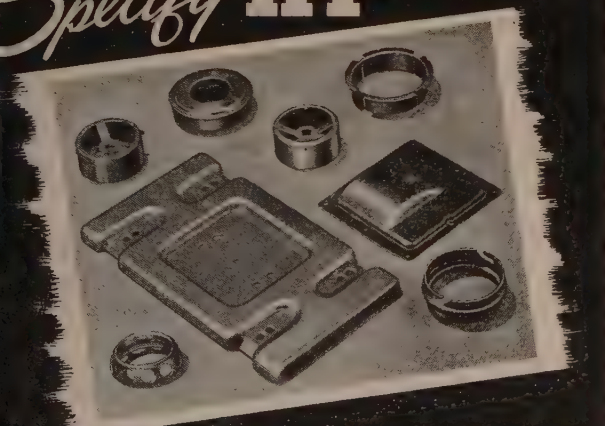
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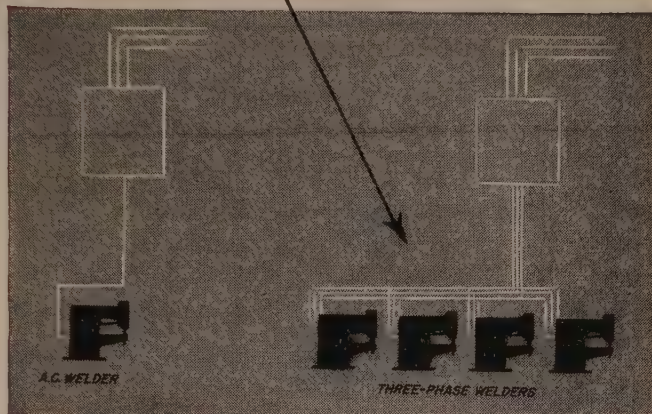
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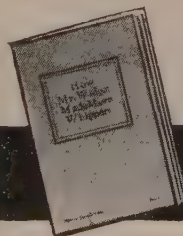


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described the use of the equipment in weld aluminum, wherein the mechanical properties the welds are equal to the properties obtained castings of the same analysis as the filler metal. Particularly stressed was the claim that welds of heavy aluminum sections may be accomplished with little or no preheat, a practice in sharp contrast to other processes wherein the filler metal is added by indirect methods.

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TABLE II
Manual Welding Speeds That Have Produced Relatively Trouble Free Welds

Thickness, in.	Speed, lpm	
	Min.	Max.
0.109	4	5
0.078	4.5	6
0.062	5	7
0.050	7	10

tion is possible in this process in welding vertical or overhead positions. Minimum electrode preparation is claimed, owing to the deep penetration. No flux is required, and the arc is visible.

The use of Heli-Welding, another inert-gas shielded welding method, in production welding of stainless steel was described by B. Blickman and N. Blickman of S. Blickman, Inc., Westport, N. J. This paper dealt with: (1) when to use heli-welding instead of other methods, (2) the choice of manual, semi-automatic and complete automatic equipment, (3) types of electrodes to be used, (4) operational speeds, and (5) the use of filler material and the method used in applying filler material. All gages of stainless from 0.010 to 3/16 in. thick can be welded, and where a finished surface after welding is required, inert-gas-shielded arc welding has considerable to offer. In welding light gages heli-welding will result in less distortion and discoloration than those made by any other fusion process.

Melting down, using metal disks as filler metal or wire filler metal formed to the shape of the weld and a nonconsumable electrode, is another general use. Tack welding without filler metal and the use of the heli-weld to close up surface cracks and pinholes are common uses.

The authors tabulated operating speeds for heli-welding with and without filler metal. Table I shows some of the speeds found applicable for use when a finished surface after welding was required. Also, manual welding speeds that have produced relatively trouble-free welds were discussed and are shown in table II. The choice of using minimum or maximum speeds in the table depend upon fit-up, backing and the amount of penetration required.

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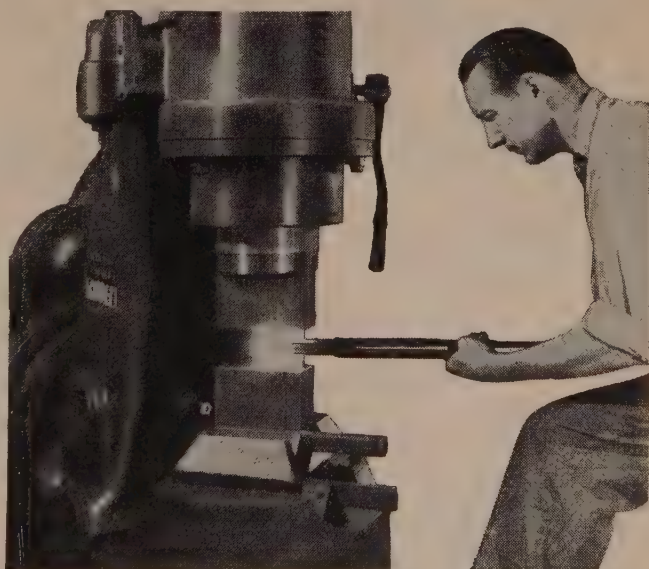


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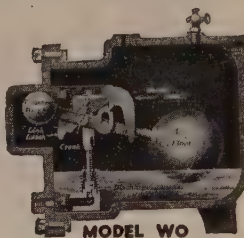


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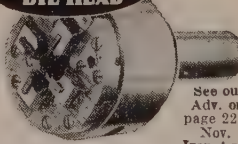
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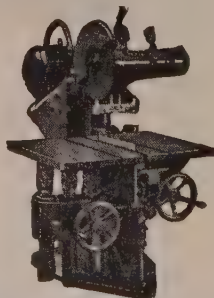
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Before patenting, the rod to be drawn is given a final hot processing on a close-coupled Morrell mill or on a looping mill, delivering No. 5 rod speeds in excess of 3000 fpm. Mill scale is removed in 7 to 9 pct H_2SO_4 at 120° to 140°F, clinging dust and scale are removed in a final pickling tub dip. After cleaning, rods are dipped in hydrated lime or alkaline solutions, principally the borates and phosphate combinations.

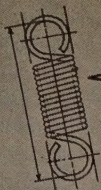
Lubricating soaps for the drawing operation are for the most part built around a fatty acid base combined with sodium or potassium to form soluble metallic soaps having high film strength. These may or may not be blended with lime. Waxes, largely beeswax, Carnuba and Myrica waxes, are added to increase melting point and film strength of the lubricant.

Lubrication was also emphasized in the report "The Hot-Rolling and Cold-Drawing of Stainless Rods and Wire" by J. K. Findley, Allegheny-Luzen Steel Corp. Cold-drawing operations some time were discouraging due to scratching or galling of the final wire in the dies. However, the author reported several coatings which have permitted reasonable speed in drawing. The metallic oxides or soft metal, particularly lead coatings used with lime and soap have proved satisfactory.

Pilot plant work has shown it economically feasible to fabricate magnesium alloy bars and allied products on bar mills, according to a paper "Production of Magnesium Alloy Rod and Wire" given by G. Ansel of Dow Chemical Co.

At the present time rod production is confined to the extrusion process, mainly direct. However, where the volume justifies plant and tool investments, it is now thought that with proper temperature maintenance there is no reason why magnesium cannot be rolled, similar to the practice used with aluminum, to produce bar and rod. In addition, it was reported that cast billets have been rolled to a variety of shapes and sizes using aluminum processing equipment.

In the extrusion process outlined by Ansel, billets weighing up to 500 lb are preheated in electric or gas-fired furnaces to temperatures from 700° to 850°F depending on the alloy. Extrusion pressures vary from 50,000 to 100,000 psi, and the extrusions are straightened



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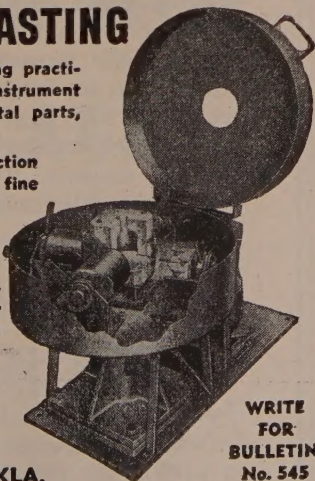
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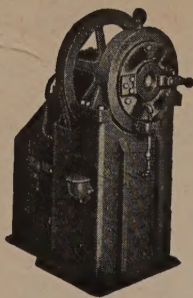
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stretching, by roller straightening or, in the case of heavy bars by gag presses. Cold-stretching increases tensile yield strength rapidly according to percent elongation. Roller straightening has no appreciable effect on properties except for the surface material where severe straightening can induce surface cracking. Cold-drawing is not practiced due to the work hardening characteristics of the alloys. In this connection, hot-drawing has been proposed and if carried out properly should make possible large reductions, but it has not been developed into a production process.

Dependence of commercial practice on the individual properties of the metal involved was further emphasized in the paper "Fabrication of Aluminum and Aluminum Alloy Rod, Bar and Wire," by W. T. Ennor, Aluminum Co. of America, which showed that the peculiarities of aluminum alloy practice relate to the surface condition of the metal and its hardness in the hot-working range.

The thin coherent oxide film covering heated aluminum does not act as a lubricant as does the scale on steel and copper, and does not prevent serious surface damage if sliding contact is permitted with rolling mill equipment. This has necessitated lubrication of rolls and guides either with soluble oil emulsion or grease, and the almost universal use of roller guides.

In addition, the aluminum alloys are quite hard and resistant to deformation, requiring as much as 50 pct more power for hot-rolling than low carbon steel. Reductions per pass are necessarily lower than those in steel rolling.

While rolling has been the most important fabricating method, extrusion is a competitive process that has not only been used as the commercial method for production of intricate shapes, but has also entered the field of simple sections.

Discussing wire-drawing lubricants for the aluminum alloys, Ennor reported that petroleum base oils have been found definitely superior to the water base lubricants from the standpoint of die scratching and wear. Natural fats and oily additives may be used. Neutral powdered soap is excellent for difficult draws, but gives a staining effect on heat treatment. Total reductions between anneals depend on the alloy. With commercially pure aluminum and solid solution types, such as 56S, reductions may be over 90 pct, while such heat-treatable alloys as 24S and 75S are seldom drawn more than 60 to 65 pct between anneals. The other alloys have intermediate drawing characteristics.

Surface condition of the metal is also a determining factor in Monel practice, as reported in the paper "Hot and Cold-Working of Monel Rods and Wire," by M. F. Buck and N. C. Britz International Nickel Co., Inc.

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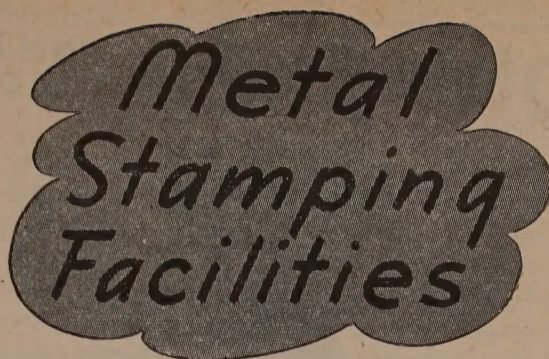
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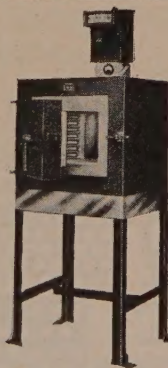
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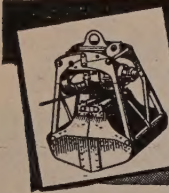
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mechanical methods, milling and chipping, for removing surface imperfections.

Sulfur-free natural gas is used for the heating preparatory to hot-rolling, as freedom from sulfur prevents intergranular attack and embrittlement. Monel does not carburize readily; therefore, an atmosphere containing an excess of combustible, largely CO and H₂, in the order of 5 to 10 pct is recommended to prevent oxidation which would result in an inferior surface quality in the hot-rolled product.

Two papers were devoted to production of copper and copper alloy rod. The first of these by P. H. Kirby, American Brass Co., describes rolling and drawing procedures; and the second by W. D. France and L. E. Thelin, Scovill Mfg. Co., was concerned with the hot extrusion process.

In the extrusion process, billets go from the furnaces by roller conveyor to the extrusion press. A total pressure of 2750 tons can be applied to the main press ram and rates of extrusion up to 5 ips are possible. The die lubricant used is a 50-50 mixture of tallow and graphite.

The results of investigations on "The Effect of Chromium on the M_s Point" reported by J. E. Bassett and E. S. Rowland, Timken Roller Bearing Co., tend to disprove the theory that the occasional stress cracking of SAE 52100 steel during heat treatment is attributable to increased chromium in solution in the austenite.

It had been suggested that enrichment of the austenite in chromium lowered the M_s point nearer room temperature where cracking is more likely to occur. However, the data reported shown in fig. 3, indicates that the effectiveness of chromium in lowering the M_s point is dependent upon carbon content, which renders the relationship more complex than was formerly believed. And in the case of chromium, at least the investigation shows that the effect is not strictly additive as had been indicated by previous work.

A method for locating the same field in both the light microscope and the electron microscope, which has been a fundamental problem in metallography, was suggested by J. S. Bryner, Pennsylvania State College, in his paper "Correlation of Optical and Electron Microscopy."

Since magnification and degree of resolution are so much higher in the electron microscope, it is often difficult to identify what is being observed, and the situation often arises where it is desirable to enlarge in the electron microscope for more detailed study of a particularly interesting structure observed with the light instrument.

Bryner's technique uses a specially designed specimen screen, containing an opening which would be absolutely identified and located in the electron microscope, fastened to the silica replica in such a position that the desired field on the specimen would be located at the identifiable opening in the specimen screen.

The technique requires more time and care than the ordinary replica technique, but has proved worthwhile in studying structures occurring only at a certain point on a specimen.